

FLIGHT

First Aero Weekly in the World.

Founder and Editor : STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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CONTENTS.

	PAGE
Editorial Comment :	
The "Suicide Club" and Naval Aviation ...	27
Of Moment in the World of Flight : Miss Trehawke Davies ...	29
Armchair Reflections. By The Dreamer... ..	30
The Paris Aero Salon... ..	31
The D.F.W. Biplane (with scale drawings) ...	34
Royal Aero Club. Official Notices ...	39
From the British Flying Grounds ...	40
Flying at Hendon ...	42
Eddies. By "Will o' the Wisp" ...	43
Foreign Aviation News ...	46
Aero Engines. By Granville E. Bradshaw ...	47
A New Military Voisin Biplane ...	49
Correspondence... ..	50
Models. Edited by V. E. Johnson, M.A. ...	51

EDITORIAL COMMENT.

The "Suicide Club" and Naval Aviation.

The present seems to be a good time for all those who regard the safety of the Empire as our most precious possession to keep a careful eye upon the doings of what are described in a circular letter of the Navy League as "the joint factions of peacemongers, anti-Imperialists, and Norman Angellites." It is scarcely necessary for us to traverse the whole controversy between the Little Navy-ites and those who believe that the best guarantee of peace is an unquestionably supreme British Navy. It is all so recent that it is perfectly fresh in the public mind. From our own point of view, however, there is this to be said. A supreme Navy argues something more than the two keels to one in capital ships which is the slogan of the Navy League. It means that not only must we be prepared to spend money on Dreadnoughts and battle-cruisers, but that our battle-fleets must be supplemented with a corresponding strength in lighter craft, down to destroyers and submarines. Therefore, it is for the country to keep careful watch that it is not deluded into the belief that because we have a superiority over our most probable enemy in the ships that lie in the line, all is well with us.

To point the moral, it is only necessary to go back a few years, when it seemed that if we were to be involved in war with a first-class Power, that Power would be France, now our very good friend and ally. There arose in that country a school of naval thought which believed that, it being impossible to overtake Great Britain in the strength of her battle fleets, the best chance of success in a naval war with us was in the possession of an enormously strong torpedo flotilla. It was argued that torpedo warfare, in which instantaneous action and surprise are the principal factors, was eminently suited to the temperament and qualifications of the French seamen. Therefore, France set to work and built torpedo craft in numbers, until she possessed a flotilla which has never been surpassed since by any naval Power. Fortunately, there was no war, and it is, consequently, impossible for us to say what effect on the respective fortunes of the two countries might have been exercised by the enormous preponderance over our own of France's torpedo craft. If the French school was right, it might have meant defeat and all its consequences for us. If, on the other hand, our own experts were right and victory in naval war belongs to the Power owning the strongest battle fleet, then France must have been swept from the seas. But the point is that there are no lessons available to show us which way things might have happened, and the argument to be deduced is that both France and ourselves were risking a good deal, France in her hopelessly inferior position in the matter of large ships, we in our inferiority in small craft. To continue the argument to its logical conclusion, to be absolutely safe, we must be armed at all points—in no detail or department of our naval service must we be outclassed by our most probable opponent. It does not matter whether the comparison be taken in the matter of battle-ships, cruisers, torpedo craft and submarines or aircraft, the result is the same.

It is here that the watching is necessary. There is not a doubt but that Mr. Lloyd George and his followers will make a determined and reckless attack on the Navy Estimates when, in a few months they come before Parliament. If they do not intend such an attack, then why all the talk about organised insanity, and the pleas for disarmament of which we have heard so much during the past few weeks. Fortunately, in Mr. Churchill we have a First Lord of the Admiralty who is perfectly alive to the necessities, and who may be trusted to get what he wants or to accept the one alternative of a Minister

who finds himself in disagreement with Parliament. But in order that he may be able to enforce his views of what is necessary, it is essential that he should have public opinion behind him, and it is here that those who view with apprehension the policy of the disarmament party can help. So far as our own part in the controversy is concerned, we hold strongly to the view, that without a preponderance of strength in aircraft, our superiority in ships must be very largely discounted when the day of trial arrives. Aircraft have—or by the time “the day” arrives will have become—to some extent, substitutes for fast craft as the eyes and ears of the fleet, setting free our cruiser squadrons for the work of protecting the trade routes and destroying the enemy’s seaborne trade. It is necessary that this aspect of the matter should be kept in mind, else it might be argued by implication that we might save money on our Estimates, by building aircraft rather than fast cruisers. That is not our argument at all, firstly because it is one of those matters upon which we do not feel disposed to dogmatise, and, secondly, because to argue thus opens up a line of controversy, which we have no desire to see initiated. Moreover, we have nowhere seen it suggested by any responsible naval authority that aircraft are likely to become substitutes for fast cruisers in the full sense of the word. In the nature of things they will at most act in relief of the cruisers in the matter of gaining early touch with the enemy, and reporting his movements to the flag. That they will at the present time be used aggressively, or that aggression will be a primary part of the functions of aircraft in naval war is not to be seriously supposed. Their uses will be different, but nevertheless valuable—nay, indispensable—to the fleet,

and it may safely be predicated that, provided always that the superiority in capital ships is not positively overwhelming on the one side, the commander-in-chief, possessing a marked inferiority in aircraft, who sets forth to find and defeat his enemy, will take the seas with an enormous handicap against him.

All this being so, the importance of every Britisher who has not lost his reason circumventing the avowed intentions of what has been aptly termed the “Suicide Club” becomes apparent. On our part, what we and all believers in the future of aircraft have to do is to use all our endeavours to so strengthen the hands of the First Lord and his advisers that the Estimates relating to the air service for the Navy may not be subjected to any cutting down at the hands of the Chancellor of the Exchequer and his fellow members of the Club. What is behind the movement we are unable to discern, but it does seem to us to be somewhat significant that the list of names published as those of the “Suicide Club” should contain the names of so many of “dose barties” who have seen fit to adopt this as the country of their naturalisation, but who, especially in the light of their recently avowed “naval policy,” cannot be altogether acquitted of the suspicion that they might possibly prefer the methods of Col. von Reutter to those of their adopted country. This is hard talk, we know, but if the inference is incorrect, then what other deduction is to be drawn from things? It would be interesting to see the supporters of the “Suicide Club” analysed, with particulars of their immediate forefathers, birth, and connections, commercial and otherwise. It should be highly illuminating to have such details of these “peacemongers, Anti-Imperialists and Norman Angellites.”



Miss Trehawke Davies handing Mr. Gustav Hamel his goggles prior to ascending with Mr. Hamel in his monoplane at Hendon on Friday, January 2nd, for the purpose of looping the loop, Miss Davies being the first woman to go through this remarkable experience in Great Britain.

JANUARY 10, 1914.

FLIGHT

OF MOMENT IN THE WORLD OF FLIGHT.



MISS TREHAWKE DAVIES.

ARMCHAIR REFLECTIONS.

By THE DREAMER.

SOMEWHERE, at sometime, I have read something about a man being a prophet in his own country. I don't remember quite what it is all about, but its substance is that if you want to be a somebody, you must bang, bang, bang on the drum, but the drum wants to be in any country but that of the banger. Nor is it even necessary that the drum and the banger should be in one and the same country at the same time. It is quite possible to live in one country, and make a noise in another; to such giddy heights have modern wonders elevated us.

If I were to write this page for the *Timbuctoo Flight*, I might be mistaken for a genius: who knows? Here in London I am simply a dreamy dreamer. I know, that even here, my wonderful writings will be stored up through the ages to come, but this is not out of any respect for myself, nor for any quality in the writings themselves; it is simply that a copy of *FLIGHT* has to be sent to the British Museum, and my page has to be accepted with the rest.

If one wants to live in England, and make a noise in a far-off land, there is one country best left alone—America. Silas P. Plunket has a way of meeting a right half-hook with a straight left.

Only a week or two ago, on November 29th, to be exact, I ventured to recount to you that little story about Mr. Frank Goodale and the green air-serpent which he encountered aloft when he got nearly frightened out of his wits. I knew I was on treacherous ground, and tried by all the tactics known to journalism to screen myself. I said right away that it was not my story, that I had gleaned it from *Everybody's Paper*, who admitted that they got it second or third hand. I even dared not to say I did not believe it: I simply said its details were picturesque, and gave it as I got it. This finessing did not save me. Almost before I had time to recover from my feeble half-hook, back comes the American straight left in the shape of a letter from Denver, Colo., which my American friend in the picturesque language of his country would call a "peach." I am not going to tell you what he said to me in that letter, at least not all of it, but he made several plain, very plain statements to the effect that he had never heard of Mr. Frank Goodale: that even if there were such a man, he never said or did anything of the kind attributed to him: that allowing that he did see a serpent, it was only one: and that anyway he didn't believe that any such paper as *Everybody's Paper* existed except in my own fertile brain, and that so far as being "picturesque" was concerned, England could give America four blocks start and a hiding. He enclosed with his letter, a few pages torn from *Everybody's Magazine*: being a short illustrated story about a whole jungle of air-serpents located over England. It was written by one of our best-known English writers, a man whose name is known throughout the world.

I wish I could show you the pictures, they're—Oh! dear, I hope I shall never go up high above the clouds, if that is a fair specimen of what may be found there. The story is in the form of a diary, picked up on the borders of Kent and Sussex, after the writer had gone aloft never to return. Somewhere about 41,000 ft. high, the airman first saw the serpents, or whatever they were. He describes the first one, as

being something like a jelly-fish, larger than the dome of St. Paul's, and as being of a light pink colour, veined with a delicate green, and having two long drooping green tentacles. Later he got amidst a whole fleet of them: some small and some large, but the majority being about the size of a balloon.

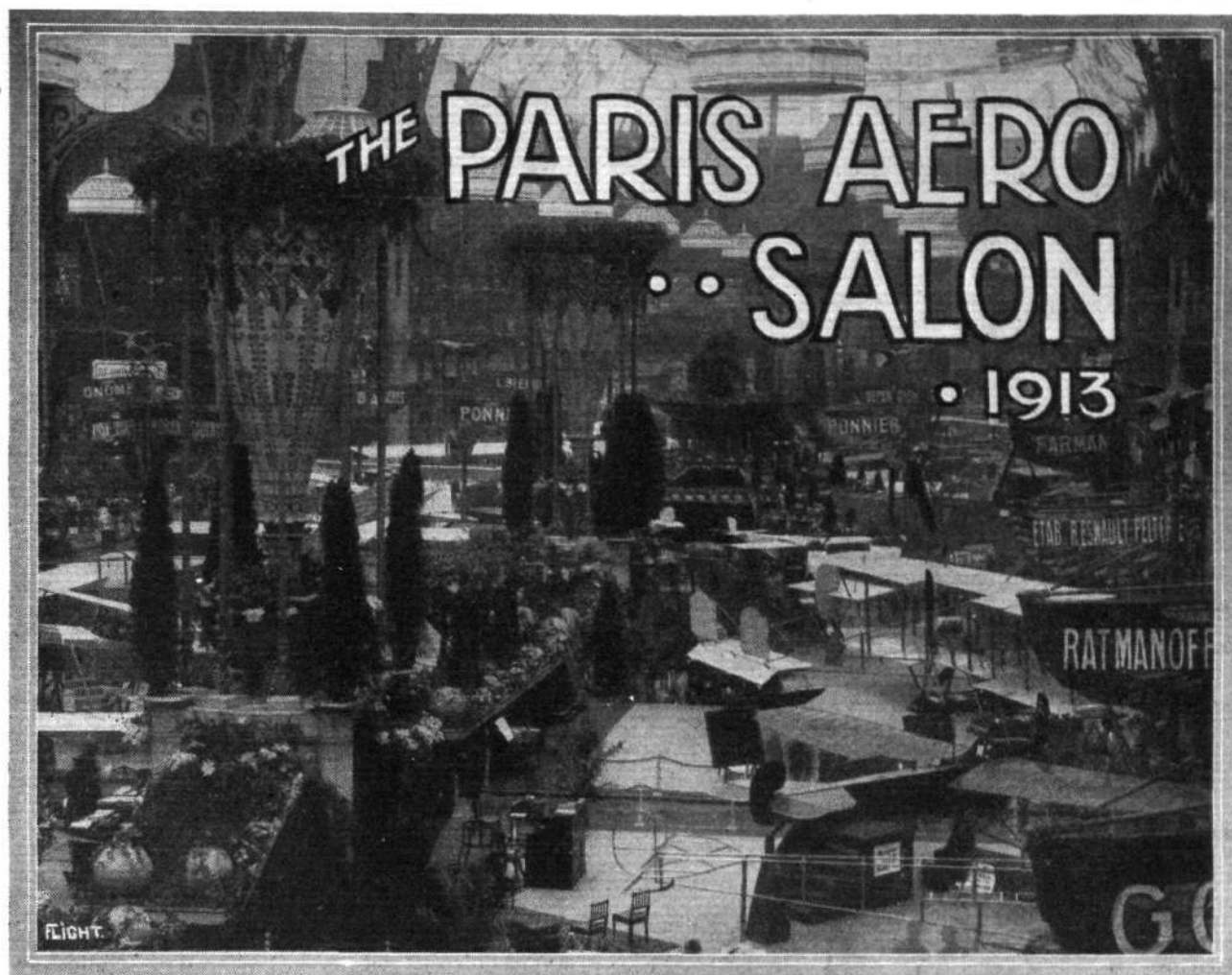
Later he says: "But soon my attention was drawn to a new phenomenon—the serpents of the outer air. These were long, thin, fantastic coils of vapour-like material, which turned and twisted with great speed, flying round and round so fast that the eyes could hardly follow them. Some of these ghost-like creatures were twenty or thirty feet long." The airman did not come to any harm on this occasion, as he dived to get away from them, but he realised that he could not tell the story to the world without proof, so later he went up again, taking a shotgun with him. From this journey he never returned, but on the last page of his diary they found: "Forty-three thousand feet. I shall never see earth again. They are beneath me, three of them. God help me, it is a dreadful death to die."

I think I won't bother about that altitude record just yet; I don't like this sort of thing at all, and I don't mind admitting to my American friend that, so far as being picturesque is concerned, we hold the cup up to now.

England and Altitude Records.

I have often wondered why it is that time and again the altitude record is made and beaten abroad. It is true, we have various little records for altitude with a certain number of passengers, but they are not in the first rank as records. Personally, when I read "with three passengers" or more, as the case may be, it always has the taste of an excuse for not going higher. Is it that we do not care about the altitude record? I admit it is not much good to whoever gets it, nor are any records for that matter, but we, I think, often defend ourselves that our men and machines are as good as any, yet we never seem to do much worth shouting about.

After all, there is public opinion—the stepping-stone by which we must reach, if we ever hope to reach, anything approaching a premier position in the world of aviation, and public opinion bases its vote or veto principally on public opinion, very much after the manner of getting a flock through a gate. Few men have the courage of their opinions sufficiently strong to stand out for them against the majority, and will flow with the tide rather than try to swim against it. In short, public opinion is but the reflex action of the opinion of those who, knowing that it is good for them, are clever enough to so arrange matters that the public shall ask for it themselves. Again, is it because we are an island nation that we never put up any distance flights such as are being done daily on the Continent? Surely the way to show the people of England what can be done with the aeroplane is to go out and do it. The main thing that is done with the aeroplane in this country is to stunt round pylons. This in itself is all right, because it provides somewhere where people can go to see machines in the air, who would probably not otherwise get a chance to see them at all; but having interested them in the art, it is a pity not to be able to move them up into a higher class—the class that teaches national defence.



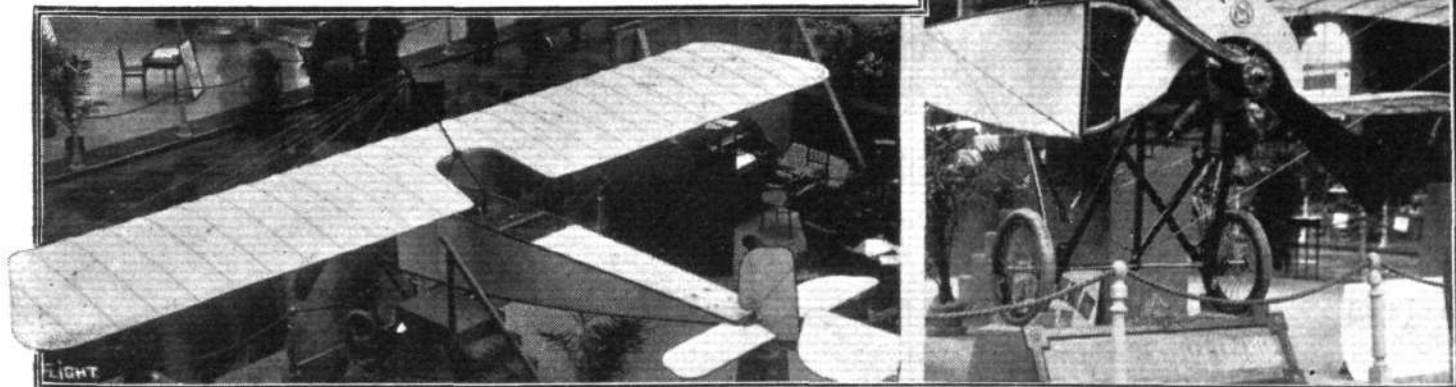
FIFTH ARTICLE.

MORANE-SAULNIER.

THE Morane-Saulnier exhibit is one of the most artistically-arranged, as well as being very interesting, from a technical point of view. The three machines shown are a single-seater similar to the machine flown by M. Garros across the Mediterranean, a tandem two-seater military monoplane, and the "Parasol." Interesting as the two first-mentioned machines are, though they are standard types, we think that the "Parasol" is the most interesting on this stand, as it represents radical alterations in design and construction. It is fitted with a 9-cyl. Gnome *monosoupape* engine mounted on overhung bearings in the nose of the *fuselage*. A neat aluminium cowl of the usual Morane type prevents oil thrown out by the engine from being blown back in the pilot's face.

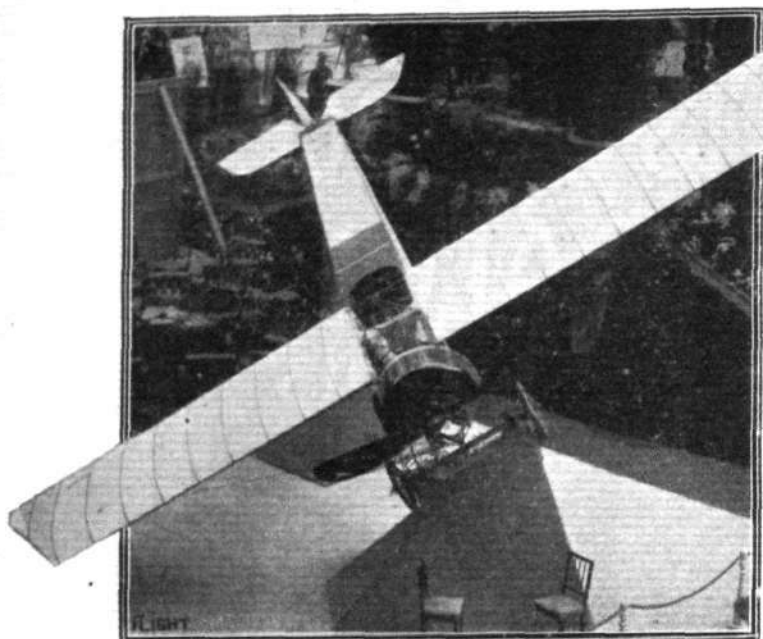
The *fuselage* is similar to those of the machines now flying at Hendon, and is built up of four *longerons* of ash converging towards a horizontal knife's edge at the stern. The struts and cross-members are made of ash in the front portion of the *fuselage*, where the greatest strength is required, and of spruce in the rear part.

The chassis is of the ordinary Morane type, which is already known to our readers through descriptions in the columns of FLIGHT. The most striking departure from standard design is in the wings, or rather in the mounting of the wings. Instead of bolting these to the sides of the *fuselage*, they have been raised a couple of feet above the *fuselage*, and are mounted on a structure of steel tubes, which converge to form a three-cornered *cabane* above the wings.



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The Morane-Saulnier "Parasol," and a view of the chassis and engine mounting.



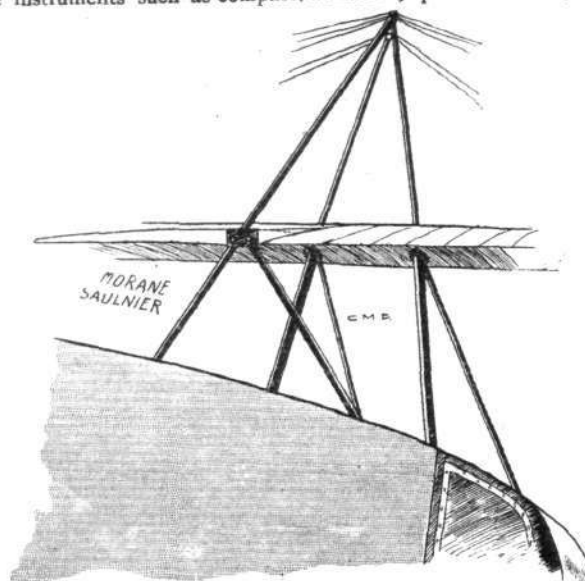
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A neat way of exhibiting a machine—one of the Morane-Saulnier monoplanes.

and which have their lower extremities bolted to the upper *longerons* of the *fuselage*. By having the wings mounted in this manner, the machine must of necessity have a very low centre of gravity, but the makers claim that it is very stable and this arrangement certainly has the very great advantage for military purposes, that an unrestricted view of the ground is obtained. Another advantage is that the angle of the lift cables is exceptionally good, the outer cable running to the chassis, whilst the centre and inner cable are taken to the lower *longeron* and the nose of the *fuselage* respectively.

Arranged tandem fashion inside a very comfortable cockpit are the pilot's and passenger's seats, the pilot being in front. Control

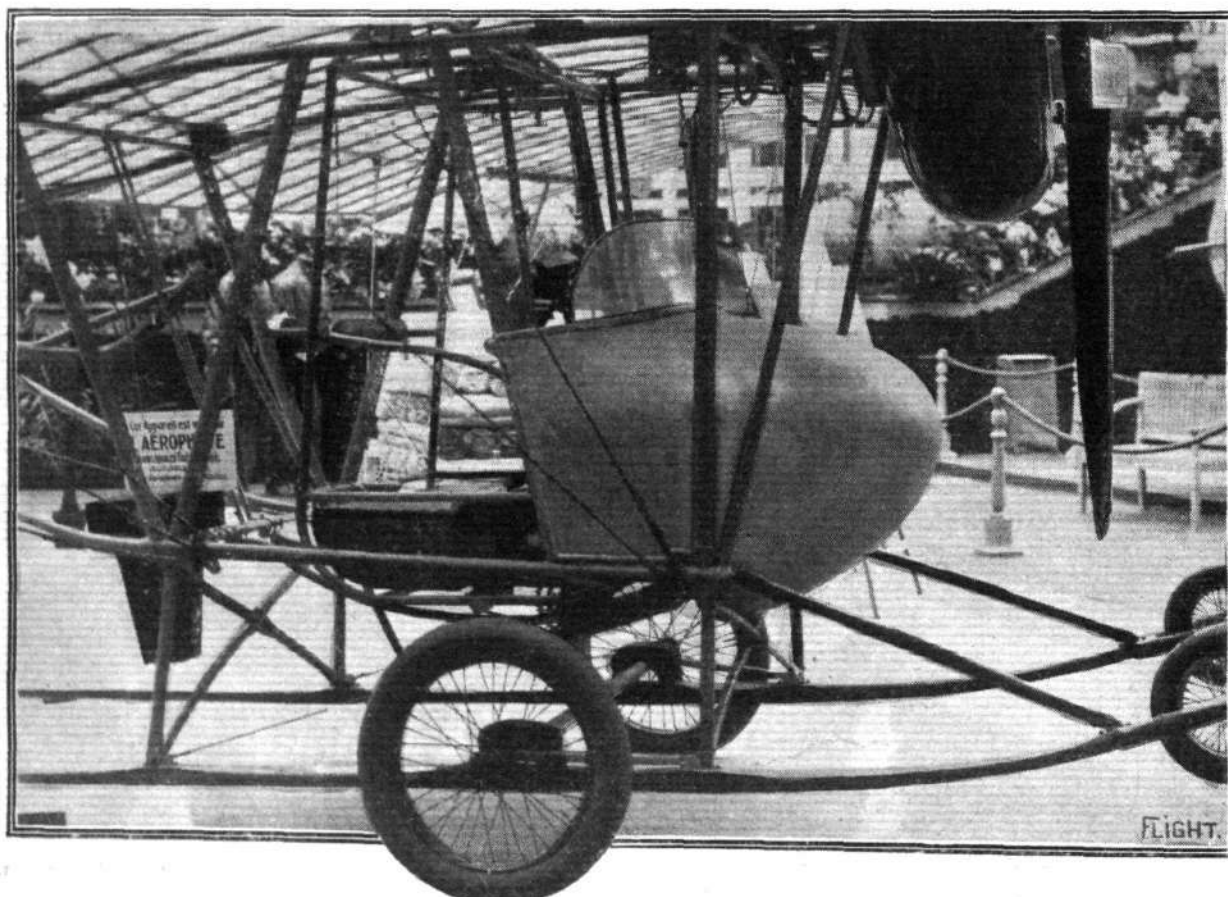
is by means of a central tubular column for warp and elevator, and a pivoted foot-bar for the rudder. In front of the pilot are mounted the instruments such as compass, altimeter, speed indicator, clock,



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Attachment of wings to *fuselage* on the Morane-Saulnier "Parasol."

revolution indicator, and map case. Let into the floor of the *fuselage* behind the passenger's seat is a specially constructed camera, the lens of which is pointed vertically downwards. By simply pulling a cord the observer exposes a plate, and when the cord is released the camera automatically changes the exposed negative and substitutes in its stead an unexposed plate. The workmanship of the "Parasol" as well as the other two machines exhibited is of the very highest order, and every detail is beautifully finished. The white fabric on the wings and *fuselages* in connection with the black enamelled steel parts and engine cowls, renders this exhibit the most graceful at the Show.



The Moreau "Aerostable."

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MOREAU.

On the Emaillite stand was shown the Moreau aerostable, which, it will be remembered, won the Bonnet stability prize. The whole machine seemed unnecessarily complicated, consisting, as it did, of a veritable forest of steel tubes. The automatic stability was purely longitudinal, the shape of the wings being supposed to render the machine automatically stable laterally, although *aileron*s are fitted. This lateral stability was greatly increased by judicious use of the rudder, as it is quite possible to keep a machine on an even keel without the use of the warp simply by increasing the speed of the dropping wing by turning the machine in the opposite direction. As for the automatic longitudinal stability, this is possessed by nearly every well-designed machine, and is secured simply by means of the longitudinal dihedral angle formed by the difference in the

angle of incidence of the wings and the tail plane. In any case one would think that this longitudinal control by means of slinging the pilot's seat could be obtained in a much simpler way.

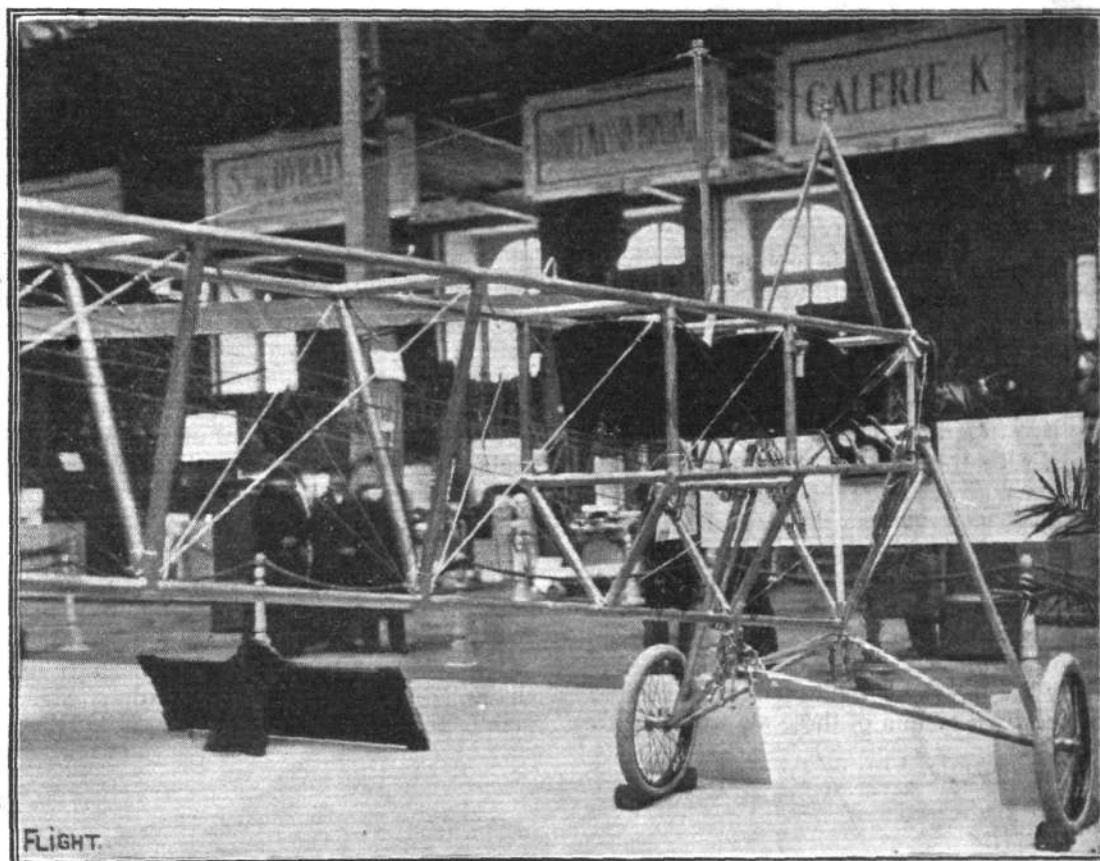
Constructionally the machine was built of steel almost throughout, the pilot's seat being slung by means of steel tubes underneath the main planes, thus giving the machine a very low centre of gravity.

This was partly counteracted by mounting the engine up in front of and on a level with the leading edge of the wings. On top of the wings was mounted the petrol tank, from which petrol is fed to the carburettor by gravity. The engine was partly covered by an aluminium shield enclosing the lower part of the engine, whilst the upper part had been left uncovered for cooling purposes.

R.E.P.

To most of the visitors to the Paris Show it was a surprise to find that the R.E.P. firm were showing, in view of the fact that Mr. Robert Esnault-Pelterie definitely retired from aeroplane construc-

an 80 h.p. Gnome engine, which did not differ materially from the earlier R.E.P. machines, already known to our readers. It was built of steel tubes throughout, and the high quality of the workman-



The skeleton of the all-steel R.E.P. fuselage.

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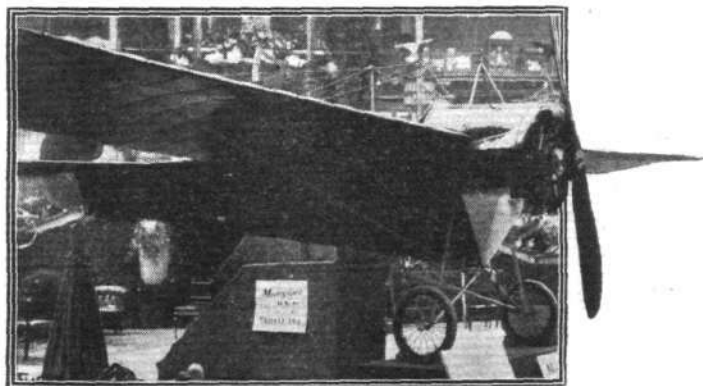
tion last year. However, one was glad to see that he had been induced to alter this decision, as it would have been a great loss to aviation generally if the withdrawal had been permanent. Of the two machines shown, one was a single-seater monoplane, fitted with

ship was readily appreciated after an inspection of the skeleton fuselage which completed the exhibit on the R.E.P. stand. The joints were not soldered, but were in most cases either bolted or welded by acetylene welding. Control was by means of a single central lever for the warp and elevator, and a foot-bar for the rudder.

The chassis was sprung in the usual R.E.P. way by a cross-arm sliding up along one of the struts in the side of the fuselage, and carrying the rudder shock absorbers, and the wheels were carried on two stub axles pivoted on the lower *longeron* on the fuselage. The wings were supported on the fuselage by fitting the spars in hinged lugs, so that no bending strain was imposed upon the rear spar when warping the wings. The upper bracing cables to the front spar were attached to the top of a triangular pyramid formed by steel tubes, whilst those to the rear spar were attached to a single tube. They do not run over pulleys in the usual manner, but were fixed rigidly to the tube which rocks laterally when the wings were warped. The lower front lift wires were secured to the keel of the fuselage, on which were also situated the pulleys for the lower warp wires.

The whole machine had been designed with a view to facilitate dismantling, and all parts had been standardised so that in case any part becomes damaged it could be easily and quickly replaced.

(To be concluded next week.)



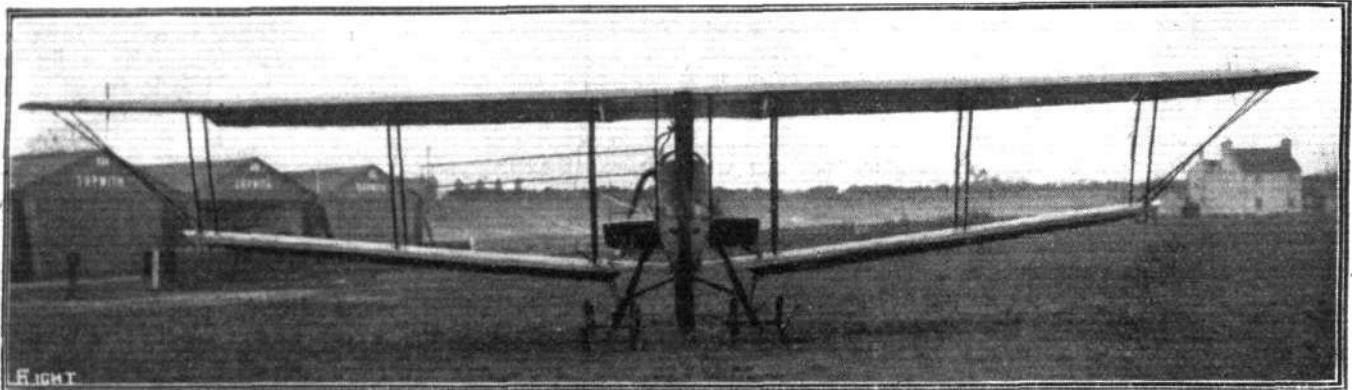
The R.E.P. monoplane.

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THE D.F.W. BIPLANE.

IF the D.F.W. biplane may be considered as being representative of German aeroplane construction—and the prominent position occupied by the German Aircraft Works (Deutsche Flugzeug Werke), of Lindenthal, near Leipzig, certainly justifies this assumption—aeroplane construction in Germany has made tremendous strides

members, a construction which, apart from being very strong, possesses a certain amount of elasticity, which greatly minimises danger of distortion due to shocks. Steel wires running longitudinally and supported on the cross-members serve to form the streamline shape of the lower portion of the *fuselage*, whilst a turtle back of three-



"Flight" Copyright.

The D.F.W. biplane from the front.

during the last year or so. In this country, steel construction has been comparatively little employed, and if for no other reason this new arrival to our shores would be of great interest. There are, however, a great number of other things to attract one's attention, both as regards design and new details incorporated in the construction.

Like the majority of German machines, this biplane is of the tractor type, with the weights of engine and pilot situated comparatively far apart. The engine, a 100 h.p. six-cylinder Mercedes, is mounted on stout ash bearers in the front portion of the *fuselage*. The radiator in conjunction with the lower front portion of the *fuselage* forms a very good entry for the air, which is allowed to flow along the gently tapering sides until it meets again behind the pointed stern.

Constructionally the *fuselage* is built up of three tubular *longerons* connected by a system of three-ply wood cross-

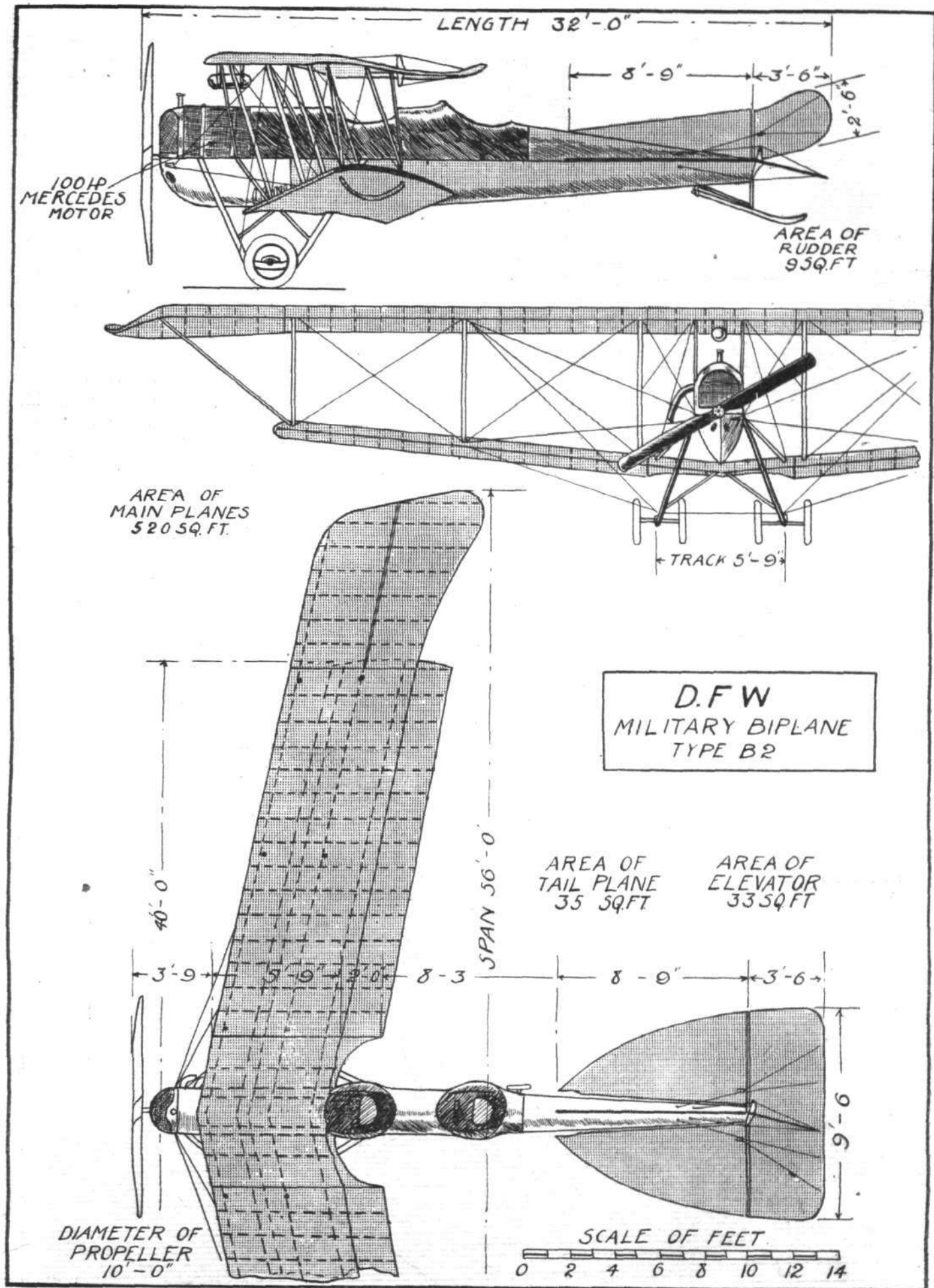
ply wood runs from a point behind the pilot's seat to the rudder post. An aluminium cover, black enamelled, extends from the engine housing to a point just to the rear of the pilot's seat. This cover is attached to the upper *longerons* by means of ordinary bonnet fasteners, and can be easily removed for the purpose of examining the controls, &c. In front of the pilot's and passenger's seats this cover is swept slightly upwards in order to deflect the air and thus form a wind-screen for the protection of the occupants.

The two seats are arranged tandem fashion, the pilot occupying the rear seat, from where he has, due to the position well to the rear of the trailing edges of the wings, a practically unrestricted view in all directions. The passenger's seat is situated sufficiently far forward to enable him to look over the leading edge of the lower plane, and thus has a good view in a downward and



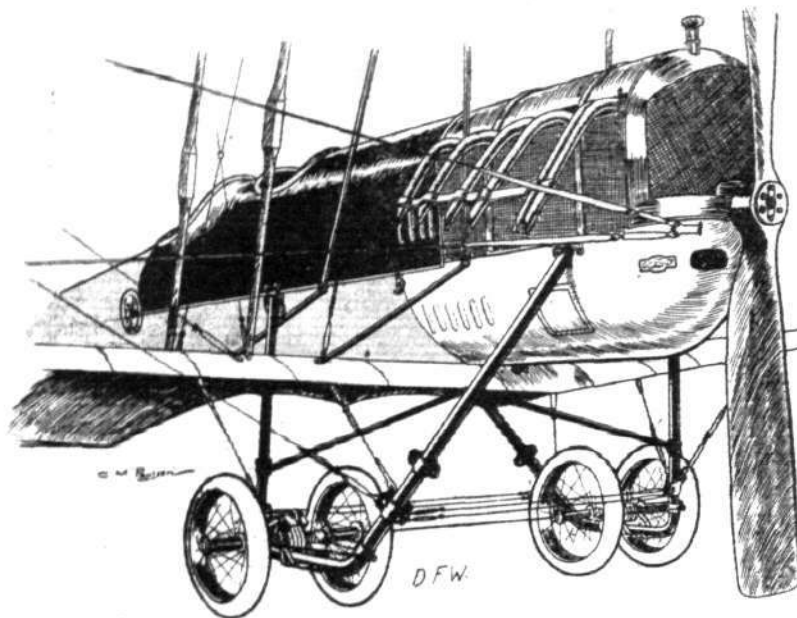
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The D.F.W. biplane, as seen from the side.



THE D.F.W. BIPLANE.—Plan, side and front elevations to scale.

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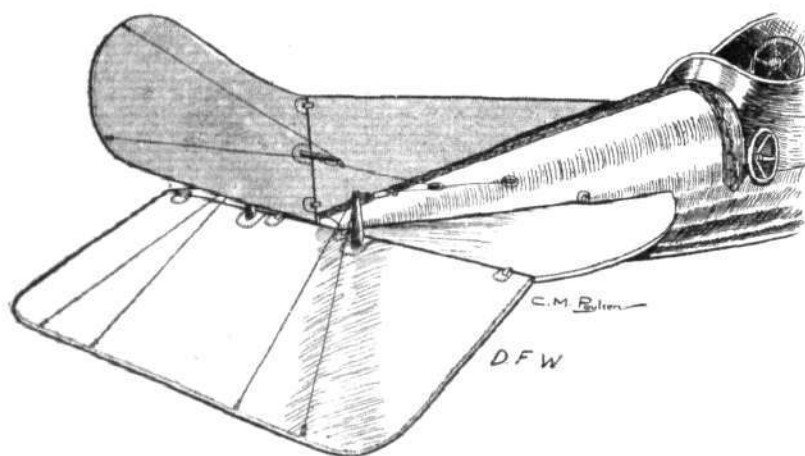


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Sketch showing front part of fuselage and landing chassis of the D.F.W. biplane.

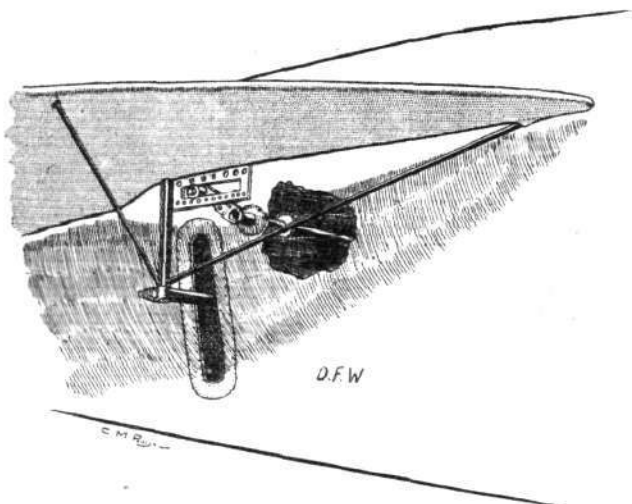
forward direction, while an unobstructed view straight downwards is obtained by cutting away the trailing edge of the lower plane in the vicinity of the fuselage. Mounted on a very neat dash in front of the pilot are an uncommonly complete set of instruments, not the least interesting of which is a very small, compact Bosch self-starter, which is in reality a small dynamo, hand operated, by means of which the pilot can start his engine with one or two revolutions of a small handle, without any necessity of swinging the propeller. This is, of course, on the assumption that there is sufficient gas in the cylinders, which seems to be always the case with the excellent Mercedes engine, for on the twenty odd times that we have seen the engine started the device never failed to work.

The controls are of the usual type, consisting of a vertical tubular column on which is mounted a hand-wheel, the rotation of which operates the ailerons, whilst the to-and-fro movement actuates the elevator. The rudder is controlled by means of two foot-pedals



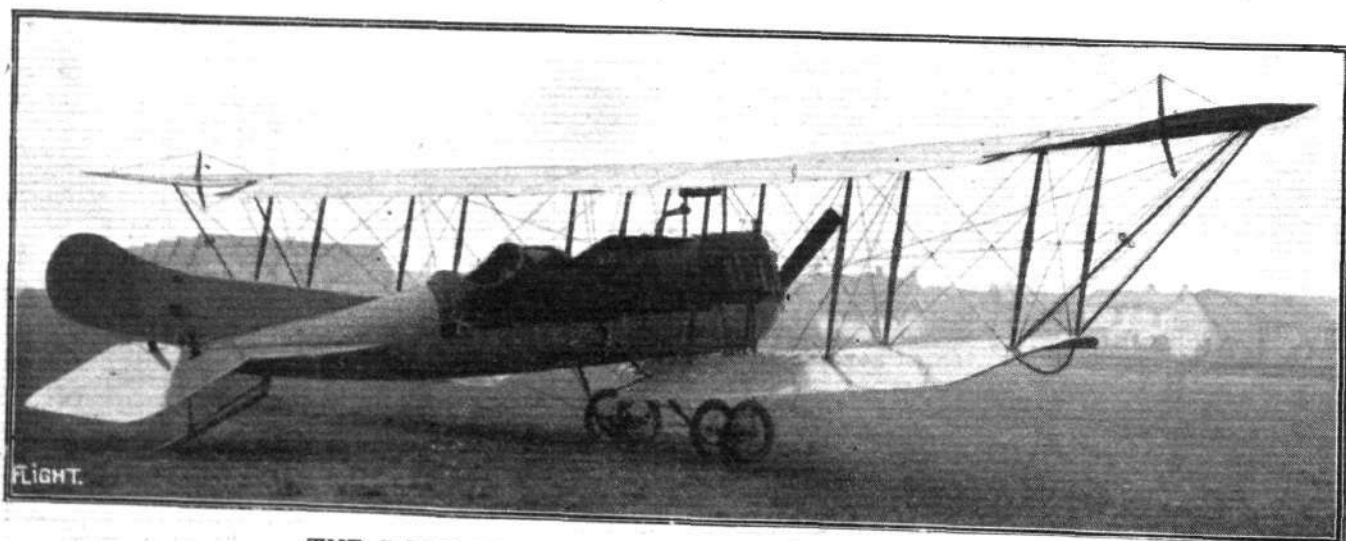
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THE TAIL PLANES OF THE D.F.W. BIPLANE.—Note the wheel outside fuselage by means of which the angle of incidence of the tail plane may be altered during flight.



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Sketch showing how angle of incidence of D.F.W. tail plane is altered.

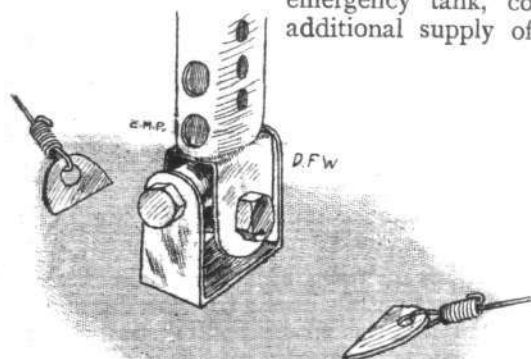


THE D.F.W. BIPLANE.—A three-quarter view from the back,

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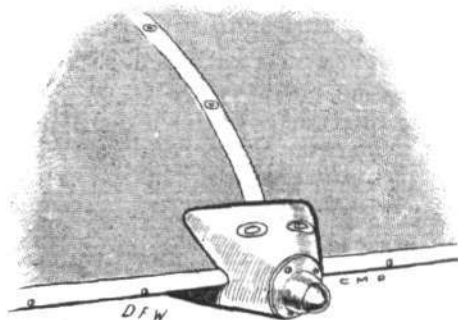
similar to those used on motor cars. Two sets of controls are provided, so that either pilot or passenger may take control of the machine at any time. If desired the passenger's controls may be easily put out of action.

Between the engine and the passenger's seat is a large petrol tank containing about 50 gallons of petrol, which is fed to the two carburettors by gravity. A smaller emergency tank, containing an additional supply of about four



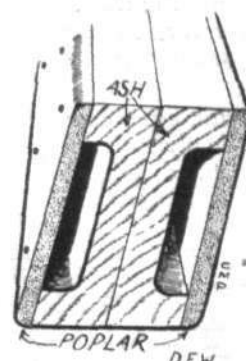
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Universal-joint on end of struts of D.F.W. biplane.



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One of the "Domes of Silence" fitted on leading edge of D.F.W. wings to facilitate moving them about inside hangar.



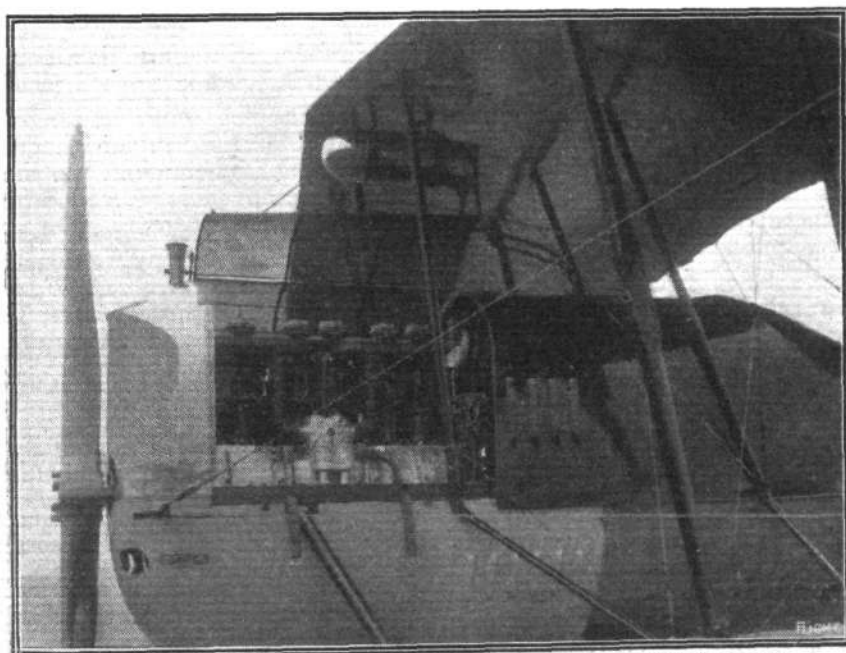
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Section of D.F.W. wing spar.

gallons, is slung underneath the top plane. Six exhaust pipes project through the fuselage covering on the right hand side of the machine, and they are made of sufficient length to ensure that no exhaust gases are blown back in the faces of the pilot and passenger. In order to keep these pipes cooler they are not exactly in line, the front one projecting more outwards from the body than the rear one so that the air is allowed to flow freely round all of them. A gauze bonnet is fitted over the engine so as to allow of easy inspection.

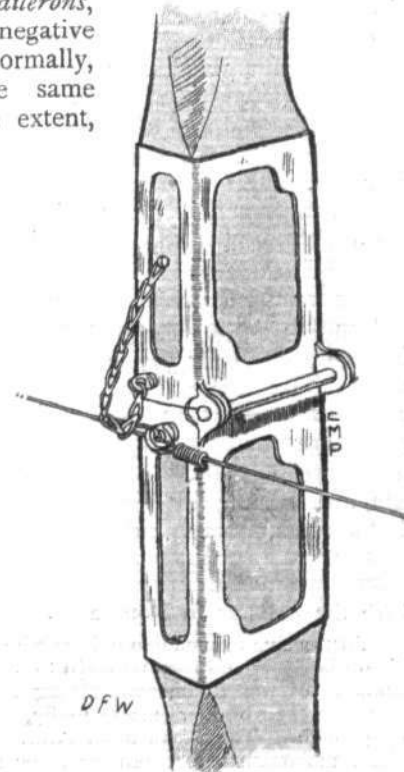
The main planes, which have a very decided slope backwards, are built up of ash spars of I section with side pieces of poplar, over which are built the ribs, which have webs of three-ply wood and flanges of lime wood. The upper plane is straight—that is to say, it has no dihedral angle—whereas the lower plane has a dihedral of

four degrees. Six pairs of struts connect the main planes, and these struts are unusual in that they are hinged in the centre so that they can be folded, thus allowing the two planes to be laid flat against one another, when the machine is dismantled. This is accomplished without in any way interfering with the cross bracing of the planes, so that these can be erected again without any adjustment whatever. The top plane has a considerably larger span than the lower one, and the two extensions



"Flight" Copyright.

The front part of the D.F.W. biplane, showing the engine in place.

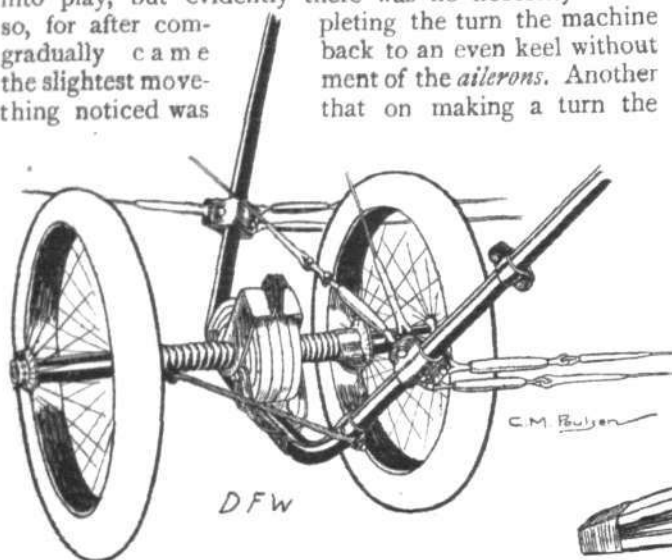


"Flight" Copyright.

Sketch showing how plane struts are hinged in the centre of the D.F.W. biplane.

as the upturned wing-tips of the Etrich and Handley Page machines. There seems, however, to be very little necessity of using these *aileron*s, for during a flight of about twenty minutes' duration on which we accompanied the D.F.W. Company's chief pilot, Herr Roempler, a careful observation of the *aileron*s revealed the fact that the pilot did not have to move them once during the whole flight. We did a steeply-banked right-hand turn only a short height above the trees just outside the track at Brooklands, where gusts and *remous* are known to be practically always prevalent, and we fully expected that here at least the *aileron*s would be called into play, but evidently there was no necessity to do so, for after coming gradually came the slightest movement noticed was

pleting the turn the machine back to an even keel without ment of the *aileron*s. Another that on making a turn the

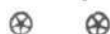


"Flight" Copyright.

One side of landing chassis showing mounting of wheels.

machine seemed to bank automatically to just the right degree, for we did not feel the tendency to lean towards the higher side generally experienced on a machine where warp or *aileron*s are employed to increase or counteract the bank; the amount of banking must, therefore, have been at least fairly correct for the particular speed and curve.

On landing, the good qualities of the chassis were demonstrated, for on running into a small mound in the ground the machine simply bounced slightly and alighted again without any shock. The chassis consists of two pairs of U-shaped steel tubes held rigid by a pyramid of four shorter and thinner steel tubes having their apex underneath the lower main plane where the keel of the *fuselage* rests on it, and secured to the U-tubes by steel clips. The chassis tubes are attached to the upper *longeron*s by clips and bolts passing outside the tubes, which are therefore not weakened by piercing. Each of the two pairs of wheels is mounted on a short tubular axle, and sprung by means of rubber shock absorbers. Coil springs on each side provide for a slightly sideways



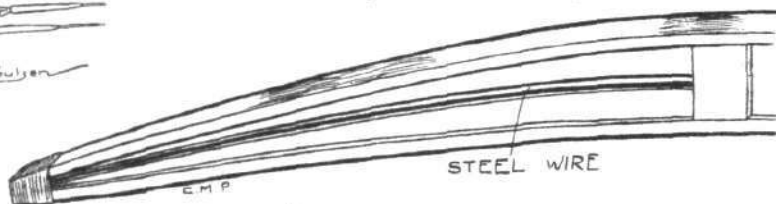
With the Bristols in Roumania.

THE twelve Roumanian officers who were taught at the Bristol Schools last year and then returned to their own country to form the backbone of the Roumanian Flying Corps, have taught a large number of their brother officers to fly, and a good many are still being taught. The Roumanian Army has a full complement of Bristol monoplanes and biplanes, including some of the latest 80 h.p. tractor biplanes, which are always fully employed.

Besides devoting or giving their attention to instructing pupils, these officers do quite a lot of cross-country flying. Capt. Popovici has made several trips of 200 miles and over, having a passenger

travel of the machine on alighting. Instead of the usual radius rods, short stranded cables are used to keep the wheels in their normal position.

In order to provide a certain amount of speed variation the angle of incidence of the tail plane can be altered while the machine is in flight. The method of doing this is illustrated by one of the accompanying sketches. The tail plane, which is pivoted round a transverse steel tube in the stern of the *fuselage*, is divided into two halves, and does not fit tightly on to the sides of the *fuselage*, sufficient space being provided to allow of the upward and downward movement of the tail plane. A short tubular axle, working in bearings in the sides of the *fuselage*, carries two short crank levers, which work in slotted steel plates on the tail plane. On this axle is mounted a sprocket wheel, from which a short length of chain and stranded cables run to an autoloc wheel mounted on the outside of the *fuselage* just behind the pilot's seat. By rotating this wheel the axle, which carries the cranks, is revolved, and the front of the tail plane moves up or down according to the direction in which the handwheel is rotated. To the trailing edge of this tail plane is hinged the elevator, which is of the undivided type. On top of the *fuselage* is mounted a small vertical fin, which has hinged to its trailing edge the rudder.



"Flight" Copyright.

The flexible rear portion of the D.F.W. ribs.

Leather edgings around all these hinges allow of easy inspection of the hinges, and in a similar way the fabric with which the *fuselage* is covered can be removed by undoing the lacing. A short rubber-sprung tail skid is pivoted below the tail planes. Stranded cables are used throughout for the wing bracing.

The weight of the machine empty is 1,460 lbs. and its speed is in the neighbourhood of 68 miles per hour. With a supply of fuel sufficient for seven and a half hours' flight, and with pilot and passenger, the machine climbs about 300 ft. per minute, and its gliding angle 1 in 8.5. The machine appeared to require a comparatively long run before taking the air, but Herr Roempler contends that there is no reason for taking a machine off too soon provided there is room enough to give it a longer run, and when required the machine will, we understand, get off in under 50 yards. Mr. Cecil E. Kny who is the designer and manager of the German Aircraft Works, intends either to erect shops for building the machines in this country, or else to arrange with some large armament firm to build them under licence.



with him, and has shown himself to be an accomplished flyer. With Lieut. Pascanu as passenger, this officer in one of the 80 h.p. Bristol tractor biplanes, flew to Botosani and back, a total distance of 750 miles. Lieut. Beroine reached a height of 3,500 ft. on a similar type machine, with full load and passenger, whilst on the following day he took one of these machines up to 12,000 ft., flying on this occasion for upwards of an hour. Lieut. Pascanu made several fine flights on the same day, two of them being cross-country of a duration of two hours each.

On December 21st, Capt. Popovici set off for a cross-country circuit and covered 83 miles in 50 minutes with a following wind, being at the rate of just over 100 miles an hour.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Committee Meeting.

A MEETING of the Committee was held on Tuesday last, January 6th, 1914, when there were present: Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Mr. G. B. Cockburn, Major J. D. B. Fulton, C.B., R.F.A., Prof. A. K. Huntington, Mr. C. F. Pollock, Mr. T. O. M. Sopwith, and the Secretary.

Congratulations to Major J. D. B. Fulton, C.B.—The Chairman, on behalf of the Committee, congratulated Major J. D. B. Fulton on the honour, Commander of the Bath, conferred upon him by His Majesty the King.

Mr. A. Mortimer Singer.—A telegram was received from Mr. A. Mortimer Singer, who is at Cannes, wishing the Club a happy New Year, and offering cups for balloon races as in previous years.

New Members.—The following New Members were elected:—John Baron, Noel Pemberton Billing, Dr. Maxime Goldberg, Sub-Lieut. John D. Harvey, R.N., Ronald Falshaw Morkill, and Lieut. C. L. N. Newall.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

- 706 William Henry Elliott (Avro Biplane, Shoreham Flying School, Shoreham). Nov. 22nd, 1913.
- 707 Sergt. John Roland Gardiner (Short Biplane, Central Flying School, Upavon). Dec. 11th, 1913.
- 708 Ian Cameron Macdonell (Bristol Biplane, Bristol School, Brooklands). Dec. 17th, 1913.
- 709 Robin George Duff (Vickers Biplane, Vickers School, Brooklands). Dec. 18th, 1913.
- 710 James Leonard Finney (Bristol Biplane, Bristol School, Brooklands). Dec. 19th, 1913.
- 711 Capt. Hugh Caswall Tremeneere Dowding, R.A. (Vickers Biplane, Vickers School, Brooklands). Dec. 20th, 1913.
- 712 Sergt. Frederick George Bateman (Maurice Farman Biplane, Royal Flying Corps, Netheravon). Dec. 20th, 1913.
- 713 Lieut. Charles Edward Ridgway Bridson (3rd Battalion King's Own Regiment) (Bristol Biplane, Bristol School, Brooklands). Dec. 20th, 1913.
- 714 Sub-Lieut. Geoffrey Rhodes Bromet, R.N. (Bristol Biplane, Bristol School, Brooklands). Dec. 22nd, 1913.
- 715 Lieut. Rowland Edward Brian Hunt (E.A.C. Biplane, Eastbourne Aviation School, Eastbourne). Dec. 22nd, 1913.
- 716 Lieut. Edmund Digby Maxwell Robertson, R.N. (Bristol Biplane, Bristol School, Brooklands). Dec. 22nd, 1913.
- 717 Andrew Delfosse Badgery (Caudron Biplane, Ewen School, Hendon). Dec. 22nd, 1913.
- 718 Lieut. Robert Crosby Halahan, R.N. (Bristol Biplane, Bristol School, Salisbury Plain). Dec. 24th, 1913.
- 719 Cecil Francis Webb (Grahame-White Biplane, Grahame-White School, Hendon). Dec. 31st, 1913.

Under New Regulations.

- 720 Robert John Lillywhite (Grahame-White Biplane, Grahame-White School, Hendon). Jan. 1st, 1914.
- 721 Sub-Lieut. Franklin Geoffrey Saunders, R.N.V.R. (Bristol Biplane, Bristol School, Brooklands). Jan. 1st, 1914.
- 722 Hugh Barnes Martindale (Vickers Biplane, Vickers School, Brooklands). Jan. 1st, 1914.
- 723 Edmund James Fulton (Vickers Biplane, Vickers School, Brooklands). Jan. 3rd, 1914.

Britannia Challenge Trophy.—It was decided to defer the award till the next meeting.

Mortimer Singer Long Distance Balloon Race.—The Committee considered the log sheet of Balloon Trip made by the Hon. Mrs. Assheton Harbord, accompanied Mr. C. F. Pollock, on December 19th, 1913, when the ascent was made from Battersea and the descent near Taunton, Somerset, a distance of about 130 miles. This being the longest distance accomplished in the Competition, the Cup was unanimously awarded to the Hon. Mrs. Assheton Harbord.

Aerial Navigation Regulations.—The report of the British Manufacturers' Sub-Committee on the Aerial Navigation Regulations was received.

Flying to the Danger of the Public.—At the invitation of the Committee, Major F. Lindsay Lloyd, the Manager of Brooklands, attended the meeting and gave his views on this subject. Mr. R. T. Gates, the General Manager of the London Aerodrome,

Hendon, was at the last moment prevented from attending the meeting, but has promised to be present at the next meeting, when the matter will be further considered.

British Manufacturers' Sub-Committee.

A meeting of this Committee was held at the Club on Tuesday, January 6th, 1914, at 4 p.m., when there were present:—Mr. J. E. Hutton (Wolseley Tool and Motor Car Co., Ltd.), in the Chair, Capt. H. Lutwyche (A. V. Roe and Co.), Mr. Fred May (Green Engine Co.), Mr. T. O. M. Sopwith (Sopwith Aviation Co.), Mr. Howard T. Wright (J. Samuel White and Co.), and the Secretary. The Committee discussed the Aerial Navigation Regulations.

Britannia Challenge Trophy.

The Britannia Challenge Trophy, presented to the Club by Mr. H. Barber, will be awarded to the British aviator who, in the opinion of the Committee, shall have accomplished the most meritorious performance in the air during 1913.

The Committee of the Club will consider the award at its next meeting on the 20th inst., and would like Members of the Club, and others interested in aviation, to send in particulars of any performance which, in their opinion, should be taken into consideration by the Committee in making the award. The Committee will also be glad to have suggestions from aviators themselves as to the respective merits of various performances which they may consider worthy of attention, as the opinion of practical fliers will naturally be of great assistance to the Committee. Letters should be addressed to the Secretary, Royal Aero Club, 166, Piccadilly, London, W., and should reach the Club not later than Monday, the 19th inst.

Airship Pilot Certificates.

Under the New Regulations, which are now in force, a candidate having an Aeronaut's Certificate must make 20 ascents in an airship. In the case where the candidate does not hold an Aeronaut's Certificate, 25 ascents in an airship must be made. These ascents must be made on different dates. Candidates are also required to pass a technical examination, the main feature of which is taking the sole control of the airship in a satisfactory manner in three of the above mentioned ascents, from the time of leaving the ground to the time of landing. These three ascents must be of a duration of not less than 15 minutes each. Candidates must be not less than 21 years of age.

The Jacques Schneider Maritime Aviation Cup and Prize, 25,000 frs.

Mr. Jacques Schneider has given a trophy of the value of 25,000 francs and a cash prize of 25,000 francs for three years for international maritime aviation competition.

The Aero-Club de France, having won the prize last year, has organisation of the race for 1914. The Prize will be competed for over a distance of 150 nautical miles. The Contest will take place exclusively at sea, outside any port, and over a course of not less than 5 nautical miles. Further details will be announced later.

Each club affiliated to the Fédération Aéronautique Internationale has the right to challenge the holder, the Aero-Club de France, and such challenge must be sent in before March 1st, 1914.

The Committee of the Royal Aero Club will select three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before Tuesday, February 24th, 1914, of their willingness to compete, if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

Gordon-Bennett Aviation Cup.

RULES FOR 1914.

The Race for the Gordon-Bennett Aviation Cup will take place in France this year.

The Race will be over a distance of 200 kilometres on a course having a minimum distance of 5 kilometres.

Competing aircraft, before taking part in the Race, will have to pass the following preliminary test:—

A flight in a straight line out and back of about 2 kilometres, without touching the ground, at a constant height of not more than 30 metres. The speed of the test shall be the mean of the speeds of the flights out and back, which must not exceed 70 kilometres per hour. In this test the aircraft must carry sufficient petrol and oil to cover the whole course of 200 kilometres. Three attempts will be allowed to each competitor.

After the qualifying tests have been passed, no modifications may

be made to the aircraft. Repairs will only be allowed with the permission and under the control of the Officials.

Each club affiliated to the Fédération Aéronautique Internationale has the right to challenge the holder, the Aero-Club de France, and such challenge must be sent in before March 1st, 1914.

The Committee of the Royal Aero Club will select the three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before Tuesday, February 24th, 1914, of their willingness to compete if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

Gordon-Bennett Balloon Race.

The cup having been won by a representative of the Aero Club

of America, the race for 1914 will take place in America. The exact time and place will be announced later.

Each club affiliated to the Fédération Aéronautique Internationale has the right to challenge the holder, the Aero Club of America, and such challenge must be sent in before February 1st, 1914.

The Committee of the Royal Aero Club will select the three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before Tuesday, January 20th, 1914, of their willingness to compete, if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

HAROLD E. PERRIN, Secretary.

166, Piccadilly, W.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

MONDAY, Christmas week, Capt. Courtney made some trips on Short 65. Lieut. Rainey on Bristol tractor 43 was flying well, taking as passengers some of the small working party left at the school.

Lieut. Rainey, on Sopwith 43, making two good prolonged flights Wednesday. Capt. Courtney went up on same machine later, but soon came down, complaining of the extreme cold, it freezing hard then. Courtney made very short flight on Dep. 36.



Sir Brian B. M. Leighton, Bart., who recently secured his *brevet* at Hendon at the Grahame-White School. Sir Brian has served 24 years in the Yeomanry, and has been in four campaigns.

Thursday, Lieut. Rainey flying well on Bristol 43, carrying passengers. Fog stopped further work.

On Monday, last week, Professor Huntington was out in very high wind. At first he only succeeded in giving his chassis very severe usage. Later, he made one short flight against the wind, and though moving very slowly his machine kept wonderfully steady. After doing one or two more wicked bumps, which would have smashed most other machines, he thought it wise to rehouse the machine.

Brooklands Aerodrome.

ON New Year's Day the new regulations of the Royal Aero Club came into force for *brevets*, and there was great keenness between the Bristol and Vickers Schools as to who should be the first to pass a pupil through under the new conditions. Mr. Sanders was the first on a Bristol biplane, taking his ticket in good style, followed a few minutes afterwards by Mr. Martindale on a Vickers biplane, who passed his tests in a most workmanlike manner, rising to 500 ft. in the first part, to 800 ft. in the second, whilst in the altitude test he executed a magnificent glide down from a height of 1,000 ft. with engine shut off, and effected a very clever landing within 10 ft. of the mark.

On Friday no less than three of the pilots left for Farnborough, Mr. Gordon Bell on a 50 h.p. Short biplane, intended for school work in the R.F.C., Mr. Pixton on a Sopwith tractor biplane, and Mr. Alcock on the Maurice Farman (100 h.p. Sunbeam).

On Saturday there was some excellent flying, Herr Roempler

taking Mr. Cecil Kny up to an altitude of nearly 6,000 ft. on the D.F.W. biplane, descending in a long glide with a well-judged landing. This machine is making more friends each week, and everyone who has had the pleasure of a flight in it is much impressed by the comfortable seating accommodation, and the behaviour of the machine in the hands of its skilful pilot. Mr. Merriam was busy with his pupils on Bristol biplanes, one pupil being taken for a cross-country trip to add to his experience. Messrs. Barnwell, Elsdon, and Knight made some good flights on Vickers biplanes with and without pupils. The Martinsyde monoplane was also flying very well. Mr. E. J. Fulton passed his *brevet* tests well on a Vickers biplane at an altitude of 500 ft., gliding down with engine shut off, and making a good landing.

On Sunday, owing to the strong wind blowing, only four machines were out. The Martinsyde monoplane was just starting when a burst tyre caused a wheel to buckle, placing the machine temporarily *hors de combat*. Mr. Merriam was next out on the Bristol biplane, but only made two or three flights. Mr. Barnwell was on the new Vickers gun-carrying biplane, and Mr. Pixton was testing the engine of a new Sopwith biplane. The winner of the ballot for the free passenger flight, Mr. F. H. Armstrong, Baker Street, Weybridge—postponed his trip until next week, owing to the weather.



2nd Lieut. T. L. S. Holbrow, R.E., who recently went through his *brevet* tests in good style on a 35 h.p. Caudron biplane at the W. H. Ewen School, Hendon.

Bristol School.—Monday and Tuesday, last week, too windy for flying. Wednesday, Merriam for test, then with Lieut. Piggott (new pupil) as passenger, also with Lieuts. Watkins and Sanders on straights and circuits. Halford twice with Lieut. Cull (new pupil). After breakfast, Halford out twice with Lieut. Piggott on circuits, and once with Lieut. Cull. Merriam sitting behind Lieut. Watkins for two flights, and then Lieut. Sanders giving tuition in figures of eight and *vol plané* landings from 400 ft., concluding by taking Lieut. Cull for a high flight. Merriam in afternoon out with Lieut. Piggott for test, and then behind Lieuts. Watkins and Sanders in straights, circuits, and eights. Halford giving tuition to Lieut. Cull.

Halford made flight for test, Thursday, and then with Lieuts. Piggott and Sanders. Merriam behind Lieut. Watkins on figures of eight, pupil having full control, then with Lieut. Cull. Halford with Lieut. Piggott on circuits, and Merriam behind Lieut. Sanders twice, the pupil having controls. Merriam with Lieut. Piggott and Lieut. Sanders, after which the latter pupil went for his certificate, which he obtained very steadily, making a *vol plané* landing from over 500 ft., this being the first certificate taken under the new regulations. Merriam finished the morning's work by giving tuition flight to Lieut. Watkins. In the afternoon, Halford made a test and Merriam followed with Lieuts. Cull and Piggott (sitting behind the latter). Afterwards sitting behind Lieut. Watkins giving landing practice. Dusk then terminated a good day's flying.

Friday, Merriam out for trial, afterwards giving two flights to Lieut. Watkins and one each to Lieuts. Cull and Piggott for landing practice. Halford then with Lieuts. Piggott and Cull on straights. Merriam and Halford with Lieuts. Watkins and Cull respectively, and the latter instructor with Lieut. Piggott, after which the wind was too bad for further tuition. At 3 p.m. Merriam made two tests and Halford one, the latter then taking Lieut. Cull for tuition. Merriam twice with Lieut. Piggott and once with Lieut. Watkins. Too bumpy for further work.

Halford with Lieut. Cull for test Saturday, and afterwards with Lieut. Piggott (twice) for straights and circuits, Lieut. Watkins (figures of eight) and Lieut. Cull (straights). Merriam with Lieut. Piggott, Lieut. Cull and Lieut. Watkins, after which he sat behind the latter pupil, who reached 1,000 ft., Merriam showing him how to make a *vol plané* landing from that height with engine off. After giving practice flights to Lieuts. Cull and Piggott, instruction went on in the hangars for the remainder of the morning. In the afternoon, Merriam took Lieuts. Piggott, Cull, and Watkins for tuition flights, and then finished the day's work with a solo to the sheds.



Mr. A. Delfosse Badgery, who has just passed his tests for his Royal Aero Club certificate, in excellent style, on the 35 h.p. Caudron biplane at the W. H. Ewen School, Hendon.

Vickers School.—Wednesday, last week, Knight and Elsdon on biplanes 20 and 21, with Messrs. Fulton, Creagh and Martindale. In afternoon with same pupils, also Messrs. Dawson, Martindale and Fulton solos. Elsdon test No. 5 mono. Mr. Waterfall solo.

New Year's Day, Elsdon and Knight on biplanes Nos. 20 and 21, with Mr. Creagh. Messrs. Martindale and Fulton solos. Barnwell with Mr. Duncan. Barnwell and Elsdon on No. 5 mono., also Mr. Waterfall. In afternoon, Mr. Martindale on biplane for *brevet*, getting through in splendid style. Barnwell and Knight with Mr. Creagh. Messrs. Chataway and Dawson solos, also Mr. Fulton.

In morning, Friday, Knight and Elsdon on biplanes 20 and 21 with Mr. Creagh and Mr. Fulton. Mr. Fulton then solo. Mr. Barnwell testing Blériot mono. and gun-carrying biplane. In afternoon, Mr. Elsdon with Messrs. Creagh and Martindale, on biplane. Knight with Mr. Creagh and Mr. Dawson.

Knight on biplane 21 with Mr. Fulton, Saturday. This pupil then for *brevet*. Messrs. Elsdon and Webb on No. 5 mono.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday and Tuesday last week,

too windy for school work. On Wednesday Mr. Webb circuits and figures of eight, afterwards flying for and obtaining his pilot's certificate. Mr. Lillywhite solo circuits. On New Year's Day Messrs. Lillywhite and Cripps solo circuits and figures of eight, afterwards Mr. Lillywhite going in for and obtaining his *brevet*.

Next day Mr. Piercy rolling and doing straights with Instr. Manton. Mr. Norris solo circuits. Messrs. Moore, Cowley, Parker



Lieut. Halahan, who has recently secured his ticket at the Bristol School, Salisbury.

and Norris straights with Instr. Manton in passenger seat. Mr. Bjorkland circuits with Instr. Manton in passenger seat.

Saturday, Mr. Norris circuits. Messrs. Piercy and Moore straights with Instr. Manton in passenger seat.

W. H. Ewen School.—Owing to the holiday season proper school work did not commence until the first day of the year, when M. Baumann and F. W. Goodden, put in some excellent flying on the 60 h.p. Caudron, taking several of the pupils for passenger flights for air and height experience. On Friday last week school was out at 7.50 a.m., when M. Baumann, after testing the 35 h.p. Caudron biplane handed the machine over to Mr. Cooper, who did some good straights and half-circuits, while Mr. McGregor and Mr. Murray were doing half-circuits and circuits in good style. Mr. Goodden was also busy with pupils; after testing machine he handed it over to Lieut. Kinnear and Mr. Banks-Price, who were doing nice straights, while Messrs. Busk and Freshney were showing good improvement in rolling practice.

On Saturday, 3rd, Messrs. Baumann and Goodden were out testing the school machines, but found it too windy for pupils.

Hall School.—Thursday, last week, J. L. Hall flying high on Caudron, also giving exhibitions during afternoon. On Friday he was flying for three-quarters of an hour on No. 1 Caudron, executing a spiral *vol plané*, with propeller completely stopped, and on Saturday exhibitions on No. 1 Caudron.

School re-opened after Christmas holidays on Monday, this week. No. 2 Caudron having in the meantime been thoroughly overhauled and the wings entirely re-covered.

Salisbury Plain.

Bristol School.—Monday last week no flying owing to high wind and snow storms throughout the day.

Busteed on Tuesday for test in the morning, and then for two long tuition flights with Mr. Stutt, a new Australian pupil. In the afternoon Voigt made three flights to test conditions, but found the weather too bad for tuition. At 3.38 p.m. Sippe, with Mr. A. E. Stone as passenger, arrived from Filton on an 80 h.p. Bristol tractor biplane. Commenced landing with four spirals from 6,000 ft. and then a *vol plané* with engine cut off from 4,000 ft., landing perfectly, close to the hangars. The pilot reported having received a few bumps *en route*, snow covered ground all the way, rather misty and very cold.

Voigt out first Wednesday for trial, and then with Mr. Gilligan and Mr. Stutt for tuition. Mr. Garnett make a solo on the biplane. After breakfast, Voigt gave four long tuition flights to Mr. Stutt, one being of half-hour's duration. Mr. Garnett did three good solos. Sippe went out on 80 h.p. Bristol tractor accompanied by

Mr. Gilligan as passenger for tests, but the weather proved unfavourable. In the afternoon Voigt took Mr. Stutt for a long tuition flight, and Mr. Garnett did two solos.

New Year's Day Busted out with Mr. Stutt and Mr. Gilligan for tuition, and in the afternoon sitting behind the latter pupil. Air-Mechanic Locker did one solo. Friday, Voigt made a solo to test conditions and then gave tuition to Mr. Gilligan (two flights) and Mr. Stutt (one flight). Mr. Gilligan then made his first solo excellently, and later followed with another equally good. Busted with Mr. Stutt for tuition. Voigt giving landing practice to Mr. Gilligan and then twice with Mr. Stutt. Voigt testing conditions Saturday,

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FLYING AT HENDON.

WHAT were, as far as we are aware, the last flights in 1913 and the first in 1914, were made by Messrs. R. T. Gates and R. H. Carr at the Hendon Aerodrome last week. On New Year's Eve these two pilots ascended on 50 h.p. G.-W. 'buses some ten minutes before midnight, and continued flying until they were well into the New Year. The night was exceedingly dark and cold, but very clear, and guiding lights were mounted on the pylons, enclosures, &c., as well as on each machine. Both pilots expressed themselves delighted with their experience, and said that the lights of London were plainly visible at a height of a few hundred feet. When Mr. Gates switched off to land *en vol plané*, he heard the church bells ringing distinctly.

On Friday, the 2nd inst., some New Year's records were put up by Gustav Hamel, who looped the loop with Miss Trehawke Davies on his 80 h.p. Morane-Saulnier monoplane. This not only constitutes the first time that a pilot has looped the loop with a passenger in this country, but it is the first time on record that one of the fair sex has participated in this feat. Previous to looping the loop with Miss Davies, Hamel made a number of loops, semi-loops, and steeply banked turns and many other startling evolutions. He also took up Miss Gladys Cooper, the popular actress, for a flight. At four o'clock Miss Davies and Hamel were securely strapped in their seats. He climbed to a height of 1,000 ft., and at this height executed one loop and what has been called a "side loop," in which he turns the machine over sideways until it is on its back, and then nose-dived to regain the normal position. From the passenger point of view this performance was all the more remarkable when it is remembered that Miss Davies had practically left her sick bed to loop the loop, and, in fact, after it was all over she returned home, where her doctor was to perform a minor operation.

On Saturday last the first of a new series of weekly meetings was held, under the title of the New Year Meeting, and as far as the "gate" was concerned was a promising beginning. It was originally intended to fly a 16-mile cross-country handicap, but owing to the mist that prevailed this was abandoned, and a speed handicap round the aerodrome substituted. Punctually at 2.30 p.m. six machines ascended one after the other, and flew around the aerodrome together for some time. This flock of six consisted of R. H. Carr and Marcus D. Manton on 50 h.p. G.-W. 'buses, Louis Noel with a passenger on the 70 h.p. Maurice Farman, E. Crawshaw on a 50 h.p. Blériot, F. Goodden on a 45 h.p. Caudron, and E. Baumann on a 60 h.p. Caudron. Manton in descending executed some of the best spirals we have seen him do. Noel also put up a star turn by making a pretty, hovering glide with his propeller stationary. Crawshaw made some really excellent bankings and spirals. After this Goodden did some flying over the course by way of practice, whilst Carr took up a passenger on the 50 h.p. 'bus. J. L. Hall also came out on his 35 h.p. Caudron, and Claude Grahame-White went up on the Maurice Farman. Philippe Marty came out next on the 50 h.p. Morane-Saulnier, Pierre Verrier ascending immediately after on a 70 h.p. Maurice Farman, taking with him a passenger. A start was then made for the speed handicap, which was flown in two heats of four laps and a final heat of six laps. Four started in the first heat as follows: R. H. Carr on the 50 h.p. G.-W. 'bus (2 mins. 59 secs.), F. Goodden on the 45 h.p. Caudron (2 mins. 57 secs.), Louis Noel on the 70 h.p. Maurice Farman (1 min. 57 secs.), and Philippe Marty on the 50 h.p. Morane-Saulnier (scratch). The only exciting incident in this heat was when Marty flew very low in passing two of his rivals, his wing tip coming within but a foot or so of the ground. Goodden proved an easy winner, being 23 secs. to the good. Noel came in second, 5 secs. in front of Marty, who obtained third place by 4 secs. Only three started in the second heat, viz.: Marcus D. Manton on the 50 h.p. G.-W. 'bus (1 min. 7 secs.), E. Baumann on the 60 h.p. Caudron (17 secs.), and Pierre Verrier on the 70 h.p. Maurice Farman (scratch). This heat resulted in another win for the

afterwards giving two tuition flights to Mr. Stutt. Jullerot then tested each biplane and the side-by-side monoplane. Sippe giving tuition flight on side-by-side monoplane to Voigt, who then went out alone on the same machine, taxiing and hopping. During the morning Mr. Garnett put in six solos, flying and landing excellently. In the afternoon Jullerot with Mr. Stutt on the biplane, and Voigt with Air-Mechanic Locker (twice), and Mr. Stutt (once), after which Air-Mechanic Locker did a good solo.

On Thursday afternoon Busted, with Sippe as passenger, made a flight on the 80 h.p. tractor biplane to the Netheravon school for demonstration flights.

Caudron fraternity, for Baumann soon obtained the lead, which he retained throughout. Verrier was close behind, however, and came in second 8 secs. after Baumann, whilst Manton arrived "home" some half a minute after. The final heat was a very good race, and was made up as follows:—Louis Noel (1 min. 7 secs.), F. Goodden (1 min. 1 sec.), E. Baumann (20 secs.), and P. Verrier (scratch). Noel kept ahead until the end of the first lap, when he was overtaken by Baumann, who again crossed the line first 5 secs. ahead. Goodden did not make quite such good time as before, and so came in last, Verrier getting third place by 7 secs. After the race numerous exhibition and passenger flights were made, one passenger taken up by Grahame-White being Mr. Marconi. The proceedings were brought to a magnificent close by another hovering glide, with the engine stopped, by Noel, lasting some three or four minutes, from a height of 500 ft. This was one of the most impressive sights seen at Hendon for some time, for not a sound came from the biplane, which was at times quite motionless.

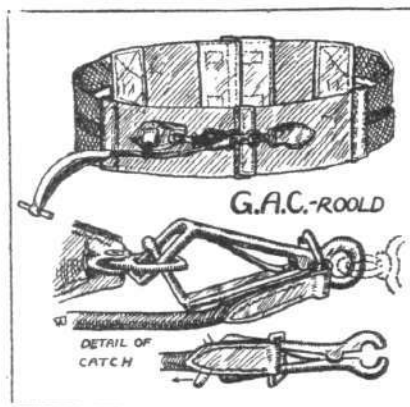
Speed Handicap (Final. 6 laps).

			Handicap.		Time.
			m. s.	m. s.	
1.	E. Baumann (60 h.p. Anzani-Caudron biplane)	...	0 20	10 38	
2.	Louis Noel (70 h.p. Renault-Maurice Farman biplane)	...	1 17	10 43	
3.	Pierre Verrier (70 h.p. Renault-Maurice Farman biplane)	...	scratch	10 56	
4.	F. Goodden (45 h.p. Anzani-Caudron biplane)	...	1 1	11 3	

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A NEW SAFETY BELT.

NOWADAYS, such positions are assumed by pilots in their machines that there is every likelihood of the one parting from the other unless there are some means of holding the pilot in his seat, by a safety belt, for instance. Although it has been proved time after time that in the case of an accident a pilot's life can be saved if he be strapped in his machine, there are times when he should be able to get clear of the latter without delay, especially should the machine catch fire. Some sort of quick release gear on a belt, therefore, is essential, but it must be one that will remain fastened until the right moment. One of the latest belts of this kind is the G.A.C.-Roold, which has been put on the British market by the General Aviation Contractors, Ltd., of 30, Regent Street, London, S.W. Our sketch of this belt shows both the general arrangement and the action of the release clip very clearly, so that it is only necessary to add that on pulling the leather thong at the side of the belt, the jaws of the clasp are opened, against the action of a spring, freeing the eye and releasing the pilot. The belt is made of strong canvas, reinforced with leather, and the sides are elastic. At the back are strong rings, securely fastened to the belt, for attaching the latter to the machine. The price of this belt is 45s., but several other patterns are made, including a cheaper model.



EDDIES.

VEDRINES seems to have made up his mind to be the champion "stunt" flyer of the age. Not content with his magnificent flight from Nancy to Cairo, his project now is to fly practically round the world. Should he carry out, and bring to a successful conclusion, his intentions, he will have passed over the following countries:—France, Germany, Austria-Hungary, Servia, Bulgaria, Turkey, Asia Minor, Syria, and Egypt. This part of the journey being already accomplished, there remains:—Mesopotamia, Persia, Baluchistan, India, Burma, Malaya, Dutch East Indies, Australia, Chili, Peru, Ecuador, Colombia, Panama, Costa Rica, Nicaragua, Salvador, Guatemala, Mexico, and the United States; surely enough to put up a record that will want a lot of beating, even when aeroplanes have become the recognised means of rapid transport. In addition, the National Aerial League have ask him to continue his journey from Cairo to the Cape, and the necessary supplies of motor spirit have already, I understand, been despatched to the proposed landing places, for if Vedrines does not feel inclined to proceed south, in view of his greater flight, another pilot, possibly Bonnier, will take his place. The route proposed is along the Nile to Wadi Halfa; follow the railway to Abu Hamed, whence the Nile will again be followed to Khartoum. After leaving Fashoda, the airman will have to cross the Bahr el Ghazal swamps, where for 250 miles there is no possibility of landing. The route will then lie over Lake Albert Nyanza, Port Florence, across the mountains to Mobasa, and thence down the coast by Zanzibar and Mozambique to Beira, from whence the railway may be followed to Cape Town. I don't think that awful swamp of Bahr el Ghazal ought to be crossed! It is tempting providence. Even with the best machines we have to-day, little things will go wrong on occasion: petrol pipes break, oil pumps refuse to work, engines, even the best of them, give trouble sometimes, and 250 miles over a country such as this, where the slightest thing necessitating a landing means death, is rather too much, and I sincerely hope that no one will try it. We want our airmen to be brave and ready to face dangers, but there is no reason why they should unnecessarily court disaster and death.

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Seeing the old year out and the new one in, took on a new phase at Hendon, when Richard Gates and Reginald Carr went up in their respective machines a little before twelve last Wednesday week, and flew into 1914. I



this year I went to bed, and was just dreaming that the Lewis Automatic Gun was firing on the enemy's aero-

plane fleet, from the top of No. 1 pylon, when some railway men on the line that runs near my house celebrated the passing of 1913 by running a truck over a few hundred fog signals. Gee! as our cousins say.

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Speaking of the new year, I see the Grahame-White Company have again been first to get a pilot through his *brevet* tests under the new regulations. Mr. Lillywhite went up early on January 1st, and secured the coveted ticket in fine style, including the descent with the engine cut out. He made a fine glide from 650 ft., making a perfect landing with the "prop" stationary.

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Oh! Why did Ewen look so pleased
On Saturday?
And why did Baumann smile as well?
And J.C., better known as "Shell"?
Was it because the Caudron—? well
It wasn't very hard to tell
On Saturday.

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An aeroplane that cannot capsize, and yet flies at 150 miles an hour, that is the latest by Dr. Robiola, of Turin. What with that, and the automatically-stable machine produced by the Orville Wright factory, I really think I shall have to go in for my own *brevet*. Fool-proof—that's what my machine will have to be, but I fear I shall have to get measured for it. I'm rather hard to fit.

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So Miss Trehawke Davies has been the first woman to loop the loop after all. Keen on it? Well, she left a bed of sickness, drove to the aerodrome, looped the loop—or did the Apple Turnover, as they call Hamel's stunt down Hendon way—and was back in bed when the doctor called to perform a minor operation. Oh! no, not keen; meant to be first, that's all.

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"What is really the matter with men and affairs at Hendon," asks the *Daily Mirror*. I don't know; nothing so far as I have noticed, unless it is that the gate eases off slightly sometimes, which they must expect at this time of the year, and that it is jolly cold, which is also in the nature of things as they must be. I don't think even Billikin, the god of things as they ought to be, could warm up an aerodrome in January. Speaking of cold, I wonder whether "Aunt" was as innocent as she pretended to be, when she sent "Nephew" a Christmas box of a pair of knitted knee-caps and a foot warmer, together with a letter that he ought not to have shown to his best friend; in which she said she had been informed that he always felt cold right up to his knees when flying. Mind you, I don't say this was at Hendon—though it might have been—there are others.



Eastbourne aerodrome seems to be a perfect hot-bed for pupil stunts. No sooner does the capricious Rainey leave off hovering over hotels with his engine cut out, or scraping the paint off gasholders, than along comes pupil J. E. B. Thornely, whose special brand of stunt is charging dykes after getting up steam by a "vol" from 2,000 ft. Really, friend Fowler will be getting quite blasé directly. By the way, F.B.F., don't forget to take the advice given in last week's Eddies, and write to me, with all the Eastbourne news. If, owing to the multiplicity of your duties, you can't find time, let Mrs. F. do so. I know there is one—now.

"Sopwith Aviation Company, Ltd. December 15th, 1913. £26,000 (£1) (6,000 six per cent. cum. pref. and 2,000 ord.) to take over, &c." Um—sounds all right. Fast little beggar that new Baby-plane. Good Hydro, too, that one that nearly got round the circuit. Clever chap T.O.M., clever men with him, too: what are we going to see in 1914?

The Army Orders for the month just issued state that sanction has been given to the formation of an Inspection Department for aeronautical material under the direct control of the Director-General of Military Aeronautics. The headquarters will consist of a Chief Inspector, an Inspector of Aeroplanes, an Inspector of Engines, and two Assistant Inspectors, with a subordinate staff of Chief Examiners, Examiners, and Writers, and will be stationed at South Farnham.

That's right! A move in the right direction. Now get a really decent fleet of machines for them to examine, and we shall all be happy.

An Aldershot correspondent states that with the weeding out of the discontents and strikers a complete feeling of satisfaction again exists amongst the employees of the Royal Aircraft Factory at Farnborough. A respon-

sible head of one of the departments has stated that the existing conditions are entirely beneficial to the men, who now enjoy the privilege of smoking in the non-dangerous buildings during overtime.

I was afraid this was not all going to end in smoke, but I am glad. But weren't there other bones of contention? Is everything satisfactory?

Overheard at Hendon.

She: "But what happens if his engine stops?"

He: "Why, he biplanes down, of course."

She: "But suppose it's a monoplane, you idiot?"

He: "Look here! What the —"

Megaphone man: "Ladies and gentlemen —"

I am sorry about that little incident in Cairo between Vedrines and Roux. Evidently, from the letters and comments in the French papers, it is little more than a misunderstanding about the use of certain stores of petrol, &c., fanned into something worse by the short temper of Vedrines, than any serious cause for complaint in the first place. In any case, it shows at least a want of tact, not to say good manners, on the part of Vedrines, to openly spurn the friendly advances of Roux before the people gathered to do honour to them both, and that, before he had, by all accounts, troubled to verify his grievance. As a French contemporary very aptly puts it (freely translated): "To make French aviation triumph is all very well, but to provide before foreigners the spectacle of a quarrel between Frenchmen—a quarrel that could easily have developed into a free fight, if Mr. Roux were not the gentleman he is—is far from flattering to our *amour propre*. Also, Vedrines has succeeded in putting an ugly finish to a story that up till then had been perfectly glorious. What France needs abroad is not only to be upheld by the deeds of her modern heroes, but just as much by an attitude and behaviour worthy of our proverbial politeness."

"WILL O' THE WISP."

The Britannia Challenge Trophy.

AN excellent line is being taken by the Royal Aero Club in connection with the award of the Britannia Trophy, which it will be remembered was offered for the most meritorious performance by a British aviator during 1913. It will be seen from the official notices on page 39 that all who are interested are invited to write to the Club giving their views as to the various flights which have been made, and the practical views of pilots are especially sought for. Letters should be addressed to the Secretary, Royal Aero Club, and they will be considered at the meeting of the Committee on the 20th inst.

Well-Deserved Honours.

CONGRATULATIONS to Capt. Godfrey M. Paine, M.V.O., R.N., Capt. Murray F. Sueter, R.N., Major J. D. B. Fulton, and Brevet Major H. M. Trenchard, D.S.O., upon whom the honour of C.B. have been conferred. Capt. Godfrey Paine is the Commandant of the Central Flying School, Capt. Murray Sueter the Director of the Air Department of the Admiralty. Major Fulton, who was an Inspector at the C.F.S., has been appointed Chief Inspector of the new Inspection Department formed in connection with the Military Wing of the Royal Flying Corps, while Major Trenchard is the Assistant Commandant at the C.F.S. In the New Year list of Naval promotions it was announced that Lieut. N. F. Osborne had been promoted to the rank of Commander.

Rapid Climbing with a Bristol.

IT is with considerable satisfaction that we learn from the Bristol Co. that in tests prior to being handed over to the Admiralty, one of the 80 h.p. Bristol tractor biplanes, piloted by Lieut. Rainey, R.N.R., and carrying a passenger, and petrol and oil sufficient for 3½ hours' flying, climbed to 1,200 ft. in 58 secs., which it is understood is a record performance.

G. Lee Temple at Uxbridge, &c.

ON Saturday, George Lee Temple flew to Uxbridge, and gave a series of exhibition flights there, and also at Lord Hillingdon's grounds, Hillingdon Court. During these flights he at times rose above the clouds, and also executed many steep banks and vertical dives. He received a tremendous ovation from a large crowd.

Flying to the Hunt.

ON the 1st inst., followers of the Pevensey Harriers at a meeting at Pevensey were surprised to see an aeroplane arriving and on its descent it turned out that the pilot was Mr. F. B. Fowler who had availed himself of his aeroplane to fly across from Eastbourne in order to attend the meet.

90 Miles an Hour on a Bristol.

MR. HARRY BUSTEED made a very fine flight on a Bristol 80 h.p. tractor biplane on Monday last. Leaving the Bristol works at Filton at 2.50 p.m., he headed off in the direction of Salisbury, at an altitude of 3,500 ft., arriving at 3.30 p.m., thus covering the distance of 46 miles in 30 mins., which is at the rate of 90 miles an hour.

Hucks and Raynham at Manchester.

ON Thursday, Friday and Saturday of last week some fine flying by Hucks on his Blériot and Raynham on the 80 h.p. Avro was seen at the Belle Vue Gardens, Manchester. On the first day Hucks did a loop very low down, and on Saturday he did his rooth loop. Raynham took up a large number of passengers on each day.

Sunbeam Activity at Brooklands.

ON Friday of last week, the M. Farman, with 100 h.p. Sunbeam engine, piloted by J. Alcock, was flown over to Farnborough and back in order to deliver some spare engine parts. A passenger was carried. Most of the time the machine was 3,000 ft. up. Some fine cross-country flights with passengers were made on the previous Wednesday and Thursday.

THE ROYAL FLYING CORPS.

THE following appointments were announced by the Admiralty on the 1st inst. :—

Lieuts. E. T. R. Chambers, H. A. Williamson and R. J. Bone, to "Pembroke," additional, for Isle of Grain Naval Air Station, temporary, as Flying Officers, December 17th.

Capt. C. F. Kilner, R.M.L.I., to "Pembroke," additional, for Isle of Grain Naval Air Station, temporary, as Flying Officer, December 17th.

Lieut. C. H. Collet, R.M.A., to "Pembroke," additional, for Isle of Grain Naval Air Station, temporary, as Flying Officer, December 17th.

Lieut. E. R. C. Nanson, R.N.R., to "Pembroke," additional, for Isle of Grain Naval Air Station, temporary, as Flying Officer, December 17th.

Probationary Sub-Lieut. Ian H. W. S. Dalrymple Clark, R.N.R., confirmed as Sub-Lieut., with seniority of July 1st, 1913, and appointed to "Pembroke," additional, for Isle of Grain Naval Air Station, temporary, as Flying Officer, December 17th.

The following were announced in the *London Gazette* of the 2nd inst. :

R.F.C.—Military Wing.—The undermentioned Flying Officers to be Flight Commanders. Dated January 1st, 1914: Capt. Gordon S. Shephard, the Royal Fusiliers (City of London Regiment); Lieut. Ernest V. Anderson, the Black Watch (Royal Highlanders), and is granted the temporary rank of Captain; and Lieut. Francis F. Waldron, 19th (Queen Alexandra's Own Royal) Hussars, and is granted the temporary rank of Captain.

Lieut. Ralph M. Vaughan, the Royal Inniskilling Fusiliers, from the Reserve, is appointed a Flying Officer, and to be seconded. Dated December 18th, 1913.

Special Reserve of Officers.—Second Lieut. Samuel Pepys Cockerell, from London Balloon Company, Royal Engineers, Territorial Force, to be Second Lieut. (on probation). Dated January 3rd, 1914.

The following were announced in the *London Gazette* of the 6th inst. :—

R.F.C.—Military Wing.—Inspection Department.—Second Lieut. Geoffrey de Havilland, Special Reserve, Military Wing, to be an Inspector. Dated December 17th, 1913.



A charming photograph received by the Editor of FLIGHT by way of a Christmas greeting from one of our most esteemed subscribers, connected with the official aeronautical world. The greeting and the legend accompanying the photograph is as follows :—

"Here's to wish you and FLIGHT a Prosperous New Year. The seven squadrons of the R.F.C., 1914. This snapshot was taken in 1913. There is every promise of their getting better wings in 1914, and as we are all enthusiasts, all our geese are swans. I may add that these are Royal property too."

R.F.C.—Military Wing.—The undermentioned Lieutenants to be Flying Officers. Dated December 17th, 1913: Donald S. Lewis, Royal Engineers; Henry Le M. Brock, the Royal Warwickshire Regiment, to be seconded; Robin Grey, Warwickshire Royal Horse Artillery, Territorial Force, to be seconded; Cyril G. Hosking, Royal Artillery to be seconded; William G. S. Mitchell, the Highland Light Infantry, to be seconded; Richard E. Lewis, the West India Regiment, to be seconded; Francis J. L. Cogan, Royal Artillery, to be seconded; John Enapson, the Royal Fusiliers (City of London Regiment), to be seconded; and Gilbert W. Mapplebeck, 4th Battalion the King's (Liverpool Regiment), to be seconded.

Special Reserve of Officers.—Owen Bulmer Howell to be Second Lieutenant (on probation). Dated January 7th, 1914.

The following was announced by the Admiralty on the 6th inst. : Chief Artificer Engineer.—F. Williams, to the "President," additional for service in Air Department, to date January 1st.

R.F.C. Inspection Department.

ARMY orders issued on the 2nd inst. announced the formation of an Inspection Department for the Military Wing of the Royal Flying Corps. The department will be under the direct control of the Director General of Military Aeronautics, and the Headquarter Staff will consist of 1 Chief Inspector, 1 Inspector of Aeroplanes, 1 Inspector of Engines, and 2 Assistant Inspectors. Major J. D. B. Fulton, R.A., has been appointed Chief Inspector and Secretary, Lieut. Geoffrey de Havilland, Inspector of Aeroplanes, and, as already announced, it is understood that Capt. R. K. Bagnall Wild, R.E., will act as Inspector of Engines.

No. 1 Squadron R.F.C.

FOLLOWING on the transference to the Naval Wing of the airships which formerly belonged to No. 1 Squadron of the Military Wing of the Royal Flying Corps, that squadron has now been reorganised as an aeroplane squadron. All airship work will be for the present allotted to the Naval Wing.

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending January 3rd :—

Flying Depot. Farnborough.—The week was devoted to experimental work and repairs.

No. 1 Squadron. Farnborough.—The bulk of the airship matériel of this squadron was handed over to the Navy on January 1st.

No. 2 Squadron. Montrose.—The squadron was employed in moving to the new flying ground and in overhaul and repair work. The weather being very rough has entailed the expenditure of much time clearing snow from the sheds, &c.

No. 3 Squadron. Netheravon.—During the week a number of reconnaissance and instructional flights were made.

No. 4 Squadron. Netheravon.—Three new BE. aeroplanes were taken over from the Depot at Farnborough and flown to Netheravon.

No. 5 Squadron. Farnborough.—Instructional flights were made by the pilots of the squadron, and overhaul and repair work carried out.



The Wright Stabiliser.

CONSIDERABLE attention has again been attracted to the Wright Stabiliser by reason of the Aero Club of America having awarded the Collier Trophy to Orville Wright in recognition of his work in connection with it. The stabiliser in principle is the same as that fully described in FLIGHT of July 10th, 1909, the controls being operated by a compressed air apparatus actuated by a vane for longitudinal stability and a pendulum for lateral stability. There have been several detail improvements, and in the latest machines a little windmill above the top plane feeds the compressed-air cylinder.

An Austro-Hungarian Circuit.

THE Royal Aero Club of Austria is co-operating with the Hungarian Aeronautic Federation in the organisation of a three days' circuit, to be held either in April or May, and for which prizes amounting to £4,200 will be offered. On the first day the route would be from Vienna to Prague, Leitmeritz, Brunn, and back to Vienna; the second day would take the competitors to Budapest via Presbourg, Gyor and Esztergom, while on the third day there would be a non-stop flight back to Vienna. The total distance is about 1,090 kiloms.

Mr. Churchill at Buc.

ACCOMPANIED by Mr. Holt Thomas, Mr. Winston Churchill was at Villacoublay on Tuesday, and paid a long visit to the Astra airship works. Later he went to the Farman works and displayed keen interest in the process of construction of the various types of machines.

FOREIGN AVIATION NEWS.

New Year's Honours in France.

THE New Year list of appointments to the Legion of Honour included the names of several military aviators. Cols. Ramazzotti and Bouttiaux were promoted to officers, while among those appointed chevaliers were Capts. Bordage, Jeannerod, Lenoir, Lagarde, Massol, and Lieut. Varcin.

Some 1913 Winners.

THE competition for three French prizes ended with the close of last year. For the International Michelin Cup, Helen, with a Nieuport monoplane stands first with his record of 16,096.6 kiloms., flown between November 2nd and December 2nd, while for the Ae.C.F. Criterium, A. Seguin is first with his non-stop flight on a 80 H. Farman from Paris to Bordeaux and back, a distance of 1,042 kiloms. For the Coupé Femina, Mme. de Laroche leads with 323 kiloms. made on her Gnome-H. Farman.

With the Loopers.

ON Sunday last looping the loop exhibitions were given by Chevilliard on his Farman at Rouen, by Pegoud on his Blériot at Prague, by Hanouille on his Blériot at Algeria, by Chanteloup on his Caudron at Crotoy, by Guillaux's on a Blériot at St. Cyr, and by Garros on a Morane at St. Raphael. Chevilliard also gave a display at Rouen on Saturday, while Pegoud gave exhibitions at Prague on December 27th and 28th. Guillaux's flights at St. Cyr, on Sunday, included loops in both directions, sometimes with the wheels inside the circle and sometimes with the wheels outside. Garros took up both Leon Morane and Audemars and looped the loop with them.

The German National Fund Prizes.

IT has been decided that for the future, flights, to earn any of the bonuses offered by the Committee of the German National Fund, must be made across country, the start and finish taking place at an aerodrome. A speed of at least 30 k.p.h. must be maintained, and the machine must not fly over the same course twice. The bonuses now offered are £50 for 2 hours' flights, £100 for 3 hours, £165 for 4 hours, £245 for 5 hours, £340 for 6 hours, £450 for 7 hours, £575 for 8 hours, £715 for 9 hours, £870 for 10 hours, £1,040 for 11 hours, £1,225 for 12 hours, and so on in proportion. There is another scheme under which the aviator who makes the longest non-stop flight, with 6 hours' duration as a minimum, will receive a monthly allowance of £100 for 5 months, or until a longer flight is made, and the pilot who makes the longest cross-country flight with a minimum of 500 kiloms. will receive a monthly allowance of £200 for 5 months, or until his record is beaten. In accepting any of these prizes, a pilot must agree to place his services at the disposal of the military authorities in the event of war, and to undergo three weeks' military training in the current year.

A Fatal Accident at Johannisthal.

WHILE a military pupil, at a school at Johannisthal, was flying over a wood in the vicinity on the 30th ult., the fabric of one of the surfaces of the biplane gave way, and the machine fell about 3,600 ft. on to the trees. The pilot, named Remus, died of his injuries later in the day.

Flying Forbidden over Russian Frontier.

AN order has been issued by the Russian Minister of War, with the approval of the Council of Ministers, forbidding the crossing of the western frontier of Russia. This order will remain in force until July 14th next.

The St. Petersburg to Paris Flight.

THE Russian Ambassador at Berlin has succeeded in getting permission for Vassiliev to fly across Germany during his proposed flight from St. Petersburg to Paris, providing he keeps clear of fortresses. The attempt, which will be made on a Morane-Saulnier monoplane, will be made as soon as possible.

Marc Pourpe in Egypt.

ON his Morane-Saulnier monoplane, Marc Pourpe set out from Cairo on his flight to Khartoum on Sunday morning. After flying 300 miles, he landed at Sohag, to attend to the engine. On Tuesday he progressed to Luxor, bringing his machine down in the desert, near the Karnak temple. The next day he arrived at Wady Halfa.

Mr. McClean Starts.

THE first stage of Mr. F. K. McClean's trip up the Nile to Khartoum, was made on Saturday last, when accompanied by two passengers, Mr. McClean piloted the 160 h.p. Short waterplane from Alexandria to Cairo, the distance of about 160 miles taking 2 hrs. 55 mins. Restarting from Cairo on Tuesday morning, with three passengers on board, the machine had to battle with the wind and eventually a stop was made at Minieh.

Bonnier to Fly to the Cape.

CONTINUING his journey from Beirut on Wednesday week, Bonnier on his Nieuport monoplane, which is fitted with Gnome engine and Integral propeller, flew to Jerusalem, where his machine, the first to land at the Holy City, attracted a good deal of attention. The next morning he flew the 250 miles to Port Said and later in the afternoon arrived at Cairo. The French National Aerial League have now asked him to continue his flight from Cairo to the Cape.

Prize for Cape to Cairo Flight.

A prize of £500 has been offered by the *Johannesburg Sunday Times* for the first aviator, who, before November 1st, flies from Cairo to the Cape. Vedrines having refused to undertake the trip, it is probable that Bonnier will continue his flight across Africa.

Flying in Persia.

ON Sunday an aeroplane was seen in flight for the first time at Teheran, the Russian aviator, Kouzminsky, piloting his Blériot monoplane over the drill square, the novel spectacle attracting a great crowd of natives.

An Aerial Ferry in America.

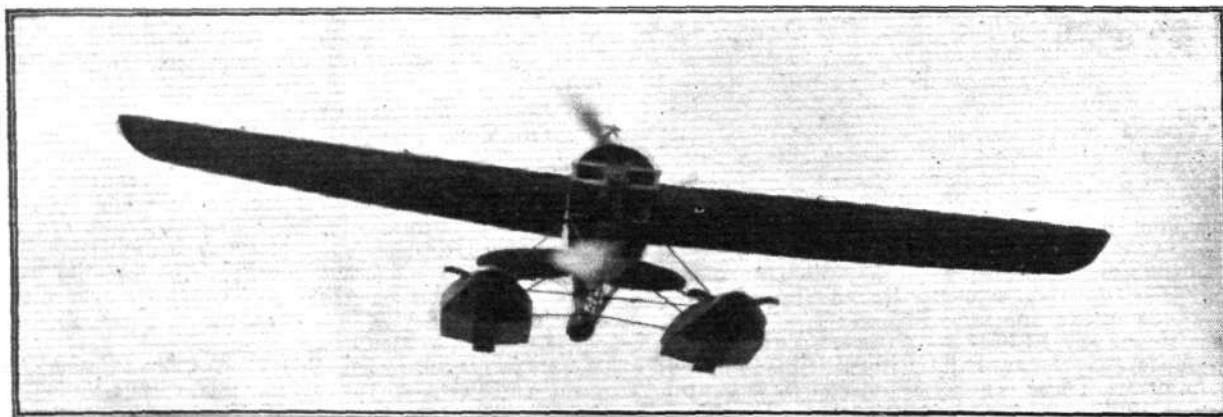
A DAILY aeroplane service has been inaugurated between Tampa, Florida, and Petersburg, which is on the other side of Tampa, about 17 miles distant. The first passenger is said to have paid £80 for the privilege, but the regular return fare is £5, and it is stated that a sufficient number of passages have been booked to keep the machine busy through the season.

To Fly Across the Andes.

THE Chilean aviator Figueroa, who has made several noteworthy flights on his Blériot monoplane, is now preparing to fly across the Andes, the lowest of which are some 12,600 ft. high. He proposes to start from Los Angeles and fly 250 kiloms. to Mendoza in Argentina.

Increasing Speed of Zeppelin.

WITH a view to adding to the speed of the German Army Zeppelins, the three motors of 170 h.p. are being replaced by four of 200 h.p., and it is stated that the aggregate weight of the new motors is less than that of the old. It is anticipated that the change will enable a speed of 95 k.p.h. to be attained.



A Nieuport hydro-aeroplane in full flight.

AERO ENGINES.

By GRANVILLE E. BRADSHAW. (Concluded from last week.)

As far as the engine designer is concerned, the shape of the engine makes quite a lot of difference, chiefly in the balance of moving parts. Unbalanced parts are not often found in aero engines, as the number of cylinders adopted is usually large, and it is easy to arrange the cylinders in such a manner that the moving parts balance one another. There are, however, quite a number of engines in which balance weights are fitted, namely, the stationary cylindered radial, and although simple rotary balance weights will correct the unbalance of the pistons and connecting rods in this particular type of engine, to design an aero engine that requires balance weights at all seems to be deliberately burdening oneself with an altogether unnecessary handicap. In one well-known radial engine, a balance weight of something in the neighbourhood of 60 lbs. is fitted.

An engine with rotating cylinders does not require balance weights, and with the exception of its lack of economy with consequently increased weight for long flights, it is an excellent engine for aviation purposes in every way. The criticisms levelled at this engine with regard to gyroscopic force when turning do not appear to have been discovered in practice.

The six-cylinder vertical engine is being favoured by many at the moment, but it is not a design that lends itself to lightness of construction, on account of the length of crank-case and crank-shaft.

A four-cylindered engine also has the same disadvantage, the weight of crank-case, crank-shaft, cam-shaft, &c., being large in proportion to the cylinder capacity. A "V" type engine is superior in this respect, as twice the number of cylinders can be fitted to the same length of crank-case and crank-shaft, with a consequent reduction in weight per brake horse-power developed.

Three, four, and five cylinder air-cooled semi-radial engines appear to be disappearing altogether, and on account of their lack of balance, their need for heavy balance weights, their uneven torque, and their head resistance, they are not likely to survive for any length of time.

Turning to the question of materials, we find that whilst the car engine designer, in order to obtain better balance and more power, turned to fitting steel pistons in his cast-iron cylinders, the aero engine designer was not long in discovering that the exact opposite is superior both in theory and in practice. It was found in car practice that in fitting steel pistons in place of cast-iron ones, more clearance between the piston and cylinder walls had to be allowed in order to prevent the piston seizing, owing to steel having a greater coefficient of expansion than cast-iron. Aero engine practice is to fit the metal which expands most on the outside, and this in practice gives a remarkable freedom from tight pistons and seizure. With piston clearances cut down to the smallest working fit, the author has found that it is almost impossible to detect any tightness of the pistons, or any tendency to seize.

More particularly is this evident in the case of air-cooled engines—the hotter the piston and cylinder become the more the cylinder expands away from the piston.

One of the greatest difficulties the aero engine designer has to contend with is the tendency for cylinders and other details to warp when heated, owing to their extreme lightness and the thinness of the walls. The cylinders have to be proportioned with the utmost care and designed so as to be of exactly equal thickness round the bore. For this reason side valves such as are general in automobile engine practice are now practically discarded in favour of overhead valves, as the latter allow the cylinder to be machined accurately both inside and out. In the case of water-cooled engines, the direction of flow of the cooler water from the radiator through the cylinder is an item of no small importance, and any inaccuracy in this very quickly shows itself in uneven wear of the cylinder. In the Gnome revolving cylindered engine, it is interesting to note that the cylinder bore and the circular radiating fins round the outside are eccentric, in order to compensate for the unequal amount of cooling air that comes into contact with the different parts of the cylinder.

Built up parts in any shape or form are undesirable, and because these have often resulted in failure, we now see elaborate details carved out of the solid forging. Cylinders are invariably machined from the solid billet, with the cooling fins turned or milled on them, whilst in the case of water-cooled engines the valve ports are milled out and spun coppers, or electrically deposited copper jackets are fitted. In other cases acetylene welded steel jackets are used with great success; the whole cylinder can in this case be carefully annealed and treated and the bore reamed out last. It is very important to provide for the unequal expansion and contraction of the cylinder and water jacket, and this is done by using either a corrugated jacket or flexible flanges on the cylinders. Heat treated steels which obtain their tensile strength and other qualities by being so treated, are unsuitable for the manufacture of cylinders, as

these cylinders are more liable to distortion, and should the engine run really hot by any chance, they are robbed of their qualities. The steel must show a high tensile strength, with preferably a percentage of elongation that is not too high, the most important item being to have a steel which gives a hard bright surface after running.

The aero engine valve is on the average much thinner and lighter than that used in automobile practice, although in both cases the exhaust valves run red hot the whole time.

The author has found that extremely long valve springs, so much advocated by long stroke designers, are directly opposed to valve gear reliability, and the one feature of the long spring, *i.e.*, the small amount of increase in pressure of the spring when the valve is lifted, is at the best a disadvantage. In aero engines valve heads are unusually large, being generally in the neighbourhood of 3 ins. in diameter, and owing to extra weight and complication it is impracticable to fit two smaller valves. The great disadvantage of a large valve is its tendency to dish in the head during a long run on full throttle, unless made of considerable thickness which is prohibited on account of the weight. The strength of a valve spring is usually made slightly in excess of that force required to accelerate the valve and valve parts in a given time, which time is determined by the speed of the engine and the shape of the cam. The force required to bring the valve to rest immediately it touches its seating on the return is very much in excess of the force required to accelerate the valve, because it is decelerated in a very much shorter time, unless the cam is arranged so as to give a slow drop.

It is practically impossible to calculate the length of time taken by the valve stem to decelerate, because this depends upon so many unknown factors, such as spring in the head of the valve, &c., but there can be no doubt that the greatest stress in any valve comes either in the neck just under the head, or in the centre of the head itself (whichever is the weaker), just at the instant of the closing of the valve.

From this it will be seen that the more metal there is in the valve stem, cotter, collar and spring, the greater is the stress in the valve stem under the head, as a greater amount of weight has to be brought to rest in the same period of time.

The author's experience is that the chief contributing factor to valve breakage is length of valve stem. This would apparently increase in a greater ratio than directly as the length of the stem, because as the length of stem (and consequently the weight) is increased, so the weight and strength of the spring necessary to operate it are increased.

The average length of valve stem in the automobile engine is somewhere in the neighbourhood of seven or eight inches, and sometimes even more than this, whilst in aero engines the stem is cut down to the shortest possible, and one highly successful aero engine that the author has come into contact with, has a 3-in. exhaust valve with an extremely light head, the stem of which is only 1½ ins. long.

Of course it is quite agreed that a long spring is in itself more reliable than a short one, but it would appear that that design is best which enables both spring and valve to have the highest possible freedom from undue stresses.

It appears that theoretically a valve stem ought to have its smallest diameter just below the cotter (in the case of an overhead valve) with the diameter increasing all the way, and running into a big radius under the head of the valve; such, however, is impracticable, the best compromise being to drill the valve stem up from the cotter end in order to reduce the weight of this part.

As regards the ratio of cylinder bore to stroke, aero engines do not appear to be following automobile practice. It is not usual to find an engine with very long stroke, as it has been found that a heavier engine results. Increasing the stroke necessitates a larger diameter crank-case, which requires to be much heavier in order to obtain the necessary stiffness. The length of the connecting rod increases at least twice the rate of increase of the stroke, whilst the power increases only as the stroke. Thus to increase the stroke of an engine two inches the connecting rod must be four inches longer, as must be the cylinders, valve gear, &c., whilst the crank-case must be increased in diameter by two inches and considerably more in weight, as the walls cannot remain the same in thickness with safety.

A long stroke engine has undoubtedly lighter pistons and slightly shorter crank-case, but the balance is in favour of the shorter stroke. Perhaps a greater drawback to long stroke than any of the above is the great increase in crank-shaft weight in order to obtain the necessary stiffness, the crank-shaft being generally the heaviest item in any but the radial type of engines.

The remarkable lightness of the crank-shaft in some aero engines is a matter of no small amount of surprise to many car engine

designers, and for the moment one cannot conceive how crank-shafts of (literally speaking) paper thickness can be expected to do the work required of them. The secret of success in many cases is the absence of a flywheel, which latter probably introduces more stress in the average crank-shaft than anything else. An extremely heavy flywheel rigidly compels the crank-shaft to rotate with an exceedingly small variation in angular velocity, the stresses in the crank-shaft due to the acceleration and deceleration of the pistons being in this case considerably greater.

From this it would seem that an engine designed to run well without a flywheel of any sort, excepting the light propeller fitted, saves not only the weight of the flywheel, but indirectly a considerable amount of crank-shaft weight.

With regard to the ratio of connecting-rod length to stroke, this is a point of design in which the aero engine builder cannot allow himself to follow his own technical reasonings. To him the angularity of the connecting-rod has to be the greatest he can use with success, as a short rod gives him a much lighter engine, and it is no uncommon sight to see a connecting rod the length of which is only some 1.6 or 1.7 times the length of the stroke. In a 4-cylindered vertical engine he of course cannot so readily ignore the importance of a long connecting rod, but this type of engine is seldom used for aeronautical purposes to-day.

The largest diameter cylinder that can be used with success as an air-cooled engine appears to hover in the neighbourhood of 100 mm., although in some of the rotary motors even larger than this is used with success. Air-cooled stationary cylindered engines, with a bore in excess of 110 mm., seem to have a desire to run hot on occasions, and to continue firing spasmodically after the ignition has been cut off. Thus, when high powers are required, it is not unusual to see engines with cylinders amounting up to twenty in number.

Trouble does not appear to arise in tuning up eight or even twelve cylinders, but one would imagine that to detect an occasionally missing cylinder out of 20, would necessitate a more than ordinary knowledge of that particular engine. If air-cooling is in the future used for very high powers, it is more than likely that long stroke engines will be used in preference to engines with an abnormal number of cylinders.

The question of bearings and lubrication of aeronautical engines is one of the most important in the advance of aviation to-day. Automobile engines running most of their life under light load, with their high quality white metal and highly efficient oil circulating systems, have given engineers an altogether too favourable impression of the reliability of such bearings. Under continuous loads of a high order, connecting rod big end bearings in particular show excessive wear on the inside of the crank, and a momentary stoppage of the oil system entails a complete overhaul, and the fitting of new white metal. A reliable lubricating system is excellent in its way, but to have to risk the ruination of a valuable engine by a small piece of dirt or an inefficient gauze is quite sufficient to warrant our looking out for a system that offers more chance of success.

It is, indeed, surprising that car engine designers have not shown more enterprise in the matter of bearings, and have, one and all, concentrated on trying to improve a system which can never hope to reach perfection.

A network of tiny oil passages, designed to supply even the remotest bearings in the engine with the correct amount of oil is not, one would think, finality in bearing design.

Even the motor cycle is some two or three years ahead of the most luxurious car engines in this respect, and although car lubrication systems were tried, other things besides economy taught that the best way to achieve success is not to try to induce the bearing to perform its duty by fitting a better method of lubricating it, but by looking round for a bearing that does not require a lubricating system at all.

It is interesting to note that one of the most successful road racing cars of this year has the crank-shaft of the engine running on a number of ball bearings.

These last mentioned, however, are not ideal for an aero engine, as their weight for the load they will carry is certainly high, and they are not altogether free from possible breakdown or derangement.

A much improved bearing, and one which promises every success in the future, is the roller bearing. These bearings have, of course, been known in different forms for years, with apparently little success, chiefly because long rollers were used which had a habit of twisting out of parallel with the axis of the shaft, and materials of the quality we have at our disposal to-day could not be obtained. In these early roller bearings wear used to take place through the rollers binding and skidding on the shaft, and serious end thrust was obtained through the rollers becoming tapered.

The rollers of to-day which have a length equal to their diameter, seem to behave much better than any other form of bearing in use. The author's experience of roller bearings in the connecting rod big

ends of engines running up to 6,500 r.p.m., convinces him, after trying every other type, that the roller bearing has a great future.

The keynote for aero engineers is undoubtedly simplicity in everything possible. An engine may be designed to perform a certain duty, and made to do its duty by the addition of many extraneous fittings and appliances, but if another engine can be designed to perform the same duty as well, without the extra appliances, the last mentioned will inevitably be more successful and more reliable.

Bolts and nuts are now looked upon as very useful and necessary details at one's disposal, whereas there can be no doubt that, although unfortunately often necessary, they are the *bête noir* of the designer, as well as the manufacturer.

The whole design of an engine may be altered by mechanics of different muscular strength assembling it, for what designer can tell the amount of initial stress that will be placed on a bolt or important part, and what amount of strength is left in the bolt or part to perform the duty it is intended to perform?

Two or three aero engines give evidence that the designer already realizes that the use of initially stressed parts is not the way to obtain the maximum amount of strength with the smallest amount of material, and the engine that uses the smallest number of bolts and nuts, and is designed so that all parts where possible are interlocking, and not stressed except by the work they have to do, stands a better chance of success.

As we cannot, to-day, have engines of absolute simplicity, the next best thing to do is to leave nothing to chance. Every possible or even conceivable risk must be removed, every part examined microscopically if necessary, and the mechanic impressed with the importance of properly securing every single bolt and nut on the engine. A thorough knowledge of the properties of every kind of material used in the manufacture of the aero engine is most essential, not particularly as regards the composition of the materials, as this is possibly better left to the specialist, but a knowledge of how each class of material behaves under stresses, its actual tensile strength (not that often stated by the manufacturers), its yield point, which is even more important, its percentage of elongation, and its resiliency.

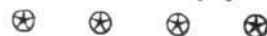
Steel of 30 or 40 tons per sq. in. ultimate tensile should never find a place in an aero engine, when steel of from 90 to 120 tons tensile, with 85 to 115 tons yield, and 15 to 9 per cent. elongation respectively, can be obtained every day. The greatest care should be exercised in using case-hardened steel for stressed parts. After case-hardening the elongation is generally nothing at all, or at the most one half or one per cent., and as in aero engines these parts have to be so light they will not stand shocks or bending loads.

The system of filling up the sump with oil and using the same over and over again is not, from the author's experience, highly satisfactory. It seems to take as long as from five to six hours on full throttle for the average water-cooled engine to attain its maximum heat all over, after this point the difference in temperature between the engine and the surrounding air is such that no increased heating takes place, no matter how long the engine is run within reason. *The quality of the oil meanwhile has become impoverished, and it is too much to ask the engine, once it has attained its maximum heat, to continue running on oil that is nearly at boiling point, and that has lost its lubricating qualities. On the other hand an engine extravagant in oil, unless some method of draining the oil away is used, becomes carbonized in the cylinder and valves get gummed up necessitating constant overhaul.

Valves and valve gear (with perhaps ignition) constitute the most unreliable parts of almost every aero engine, and there can be not the slightest doubt that an engine without valves will quickly supersede the present type as soon as such an engine can be found.

Sleeve valves do not offer a solution to the problem, because they necessitate increase of weight over present types, whilst decrease of weight is the most important factor.

The two-stroke cycle principle does not appear to be receiving the attention it deserves, and because it is already successful in that it has very few parts, will actually run, and is already a commercial proposition, one cannot help thinking it ought to be developed more, despite the enormous amount of natural prejudice against this type.



AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

Meeting.—The fifth meeting of the forty-ninth session will be held on Wednesday, January 21st, at 8.30 p.m., when Sir Alfred Keogh, K.C.B., F.R.S., will preside. Mr. Leonard Baird, A.R.C.Sc., will read a paper, to be followed by a discussion on "The Stability of Aeroplanes," illustrated by experiments with paper gliders.

Members are reminded that, under the Rules, they may introduce visitors to General Meetings.

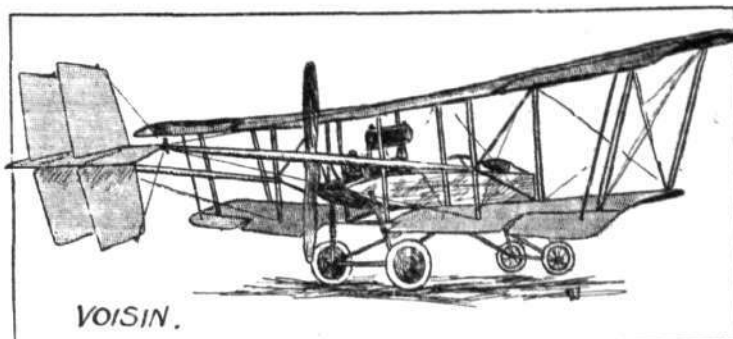
Tickets for visitors, not introduced, may be obtained from the Secretary, 11, Adam Street, Adelphi, W.C.

BERTRAM G. COOPER, Secretary.

A NEW MILITARY VOISIN BIPLANE.

ONE of the Voisin machines recently turned out by this historic aeroplane factory possesses several very interesting features, as the accompanying sketch will show. Like most of the Voisin machines of recent years, it is constructed for the greater part of steel. It is a biplane of the "headless" type, and differs from previous models in the method of carrying the tail. Instead of the usual two pairs of triangular outriggers from the main planes, two single outriggers or tail booms are employed. Each of these is attached to the centre of one of the rear plane struts on either side of the *nacelle*, and extends rearwards horizontally, or parallel to the line of flight. These tail booms, therefore, offer considerably less resistance than the triangular arrangement. Both tail booms are strongly braced to the main planes, whilst the struts carrying the former are also strengthened by a pair of diagonal cross-struts to the corresponding fore-struts. The rear extremities of the tail booms carry a single elevator tail-plane, which in turn carries two pairs of vertical rudders that move bodily with the elevator. Each pair of rudders is divided into two and arranged above and below the elevator. Mounted in the centre of the lower main plane is the *nacelle*, which extends well in front of the main planes. The pilot and passenger are seated in separate

cockpits in front of the *nacelle*—the pilot being behind—whilst in the rear is mounted the engine, a 200 h.p. Clerget, which drives the propeller by means of chain gear. The *nacelle* is supported by a very simple sprung



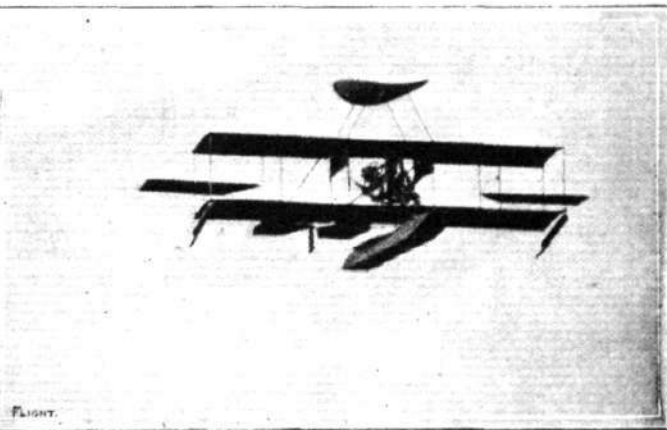
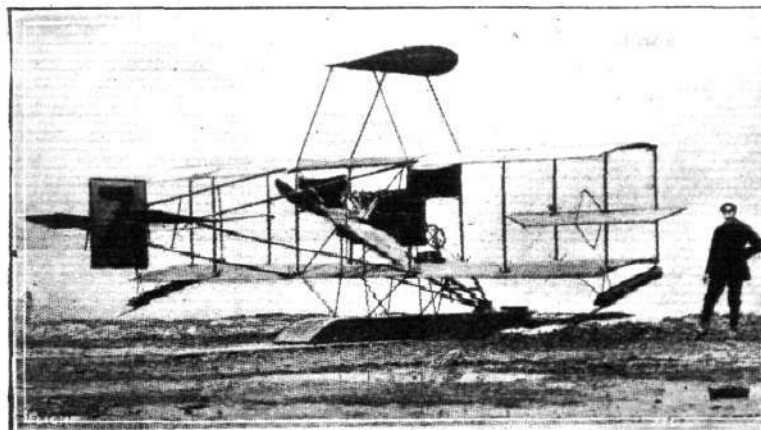
chassis, similar to those on other Voisin machines, and there is also a pair of wheels mounted on the nose of the *nacelle*. Ailerons are employed for lateral balance, and the main planes are set at a slight dihedral angle. The span of the machine is 15 m., and the weight of the machine ready for the air is 1,300 kilos.

"VEE JAV."

A NEW AMERICAN STABILIZER.

FROM America comes some details of a new device for securing automatic stability that has just been tried and found to work satisfactorily. Briefly, it consists of a disc of fabric stretched over a light framework of wood, and mounted some distance above the main planes. The two transverse edges are turned upwards about

which the device is mounted begins to side-slip to the left. The upturned left side of the stabilizer then offers a certain amount of side area to the current of air which is travelling across the path of the machine. As the point of application of this transverse air current is a considerable distance above the centre of gravity, the



THE CURTISS HYDRO-AEROPLANE FITTED WITH DISC STABILIZER.—On the right the machine in flight.

10 ins., thus presenting a slight side area to a cross-current of air. Mr. William S. Luckey, the Curtiss pilot, has just been testing the device for its inventor, Mr. H. C. Fiske, and found that it increased very materially the lateral stability of his Curtiss biplane. The action of the stabilizer is as follows: Suppose the aeroplane on

machine naturally tends to return to its normal position. It is not evident wherein this device differs in effect from the usual dihedral angle of the main planes, and we should be inclined to think that while it may possess the advantages of the dihedral angle it would also suffer from the same drawbacks.

The First Pilots under New Rules.

It will be seen from the official notices of the Royal Aero Club on p. 39, that three pilots succeeded on New Year's Day in qualifying for their certificates under the new and more stringent rules. Their names in the order in which their certificates were granted were:—720 R. J. Lillywhite (Grahame-White School), 721 Sub-Lieut. F. G. Saunders, R.N.V.R. (Bristol School), and 722 H. B. Martindale (Vickers School).

Flying at Shoreham.

On Thursday, Friday, and Saturday of last week a considerable amount of flying was done by the pupils and by Instructor W. H. Elliott on the Avro machines belonging to the school. Lieut. Clemson has succeeded in doing really excellent straights in a good wind, and Mr. Purnell shows marked improvement. Mr. Hayland-

Wilson, a new pupil, was out for the first time on Saturday, and was certainly very enterprising, inasmuch that he accomplished a banked turn very low down. Mr. Cecil Pashley's machine has been rendered *hors de combat*, having had the front elevator smashed.

A New Grade of Emaillite.

A NEW grade of British-made Emaillite—to be known as No. 7—is being placed on the market by the British Emaillite Co., Ltd., of 30, Regent Street, W. It is a liquid dope, and a very special point is that it is non-inflammable both before and after being applied to the fabric; it will extinguish flame if poured upon it. Three coats are said to efficiently dope any fabric, tightening and strengthening it, and rendering it both water and rainproof, besides giving a very pronounced glossy finish.

CORRESPONDENCE.

Safety Aeroplanes.

[1819] Further to my letter on the subject of safety aeroplanes, which you kindly published in your issue of November 8th (1807), I note with interest Mr. Coanda's letter (1815) on this matter and the stress laid on the necessity for "unlooked for efforts by means of controls" (an essential feature of the phenomenon to which he refers), which really amounts to "control efforts" such as to render a machine capable of rapidly recovering the normal position under all circumstances.

It is, of course, apparent that a machine possessing planes of a uniform chord, with the whole lift distributed laterally, must be subject to "rolling" and considerable effort on the part of the pilot to maintain an "even keel" when encountering severe wind gusts. These effects, however, would be less marked with tapered planes, which compound the air velocity in order to distribute the lift laterally and longitudinally, provided some means were employed whereby the machine would be rendered less susceptible to dives, &c.

Having made a series of experiments in accordance with my views hereon, I am about to introduce a machine which will give stability by means of stabilising planes, interconnected and acting under load in such a manner as to automatically "line" the machine to the prevailing atmospherical conditions, such that no upsetting tendency prevails. These stabilising planes maintain a uniform plane lift, any pressure in excess of their normal lifting capacity being disposed of automatically, without any "damping out" process or series of oscillations about their combined axes of rotation.

Battersea, S.W.

JOHN W. ROBINS.

Some Suggestions.

[1820] Can any of your correspondents give a good reason for the persistence of aeroplane constructors in making machines with a very small dihedral? Models clearly show that a large dihedral makes an otherwise unstable machine into a stable one, and,

indeed, into a machine which will right itself if it be started in an inverted position.

An aeroplane which will glide at all in an inverted position is a dangerous machine.

The writer has been often struck by side gusts, and an instant application of the control becomes necessary; but if the machine had been a laterally self-righting one, the whole incident would

have been met with much equanimity on each occasion, for the immediate effect of the gust may be more marked, but the ultimate result of it negligible.

Models also show that it is not at all essential to have the centre of effort and the centre of gravity in the same line, or very near it.

With regard to engine failure due to misfiring through a choked sparking gap, a form of sparking-plug in which there is a hollow space with a narrow aperture dead in line with the gap effects a strong blast on the gap space on each explosion and expansion stroke and keeps it clear of deposit.

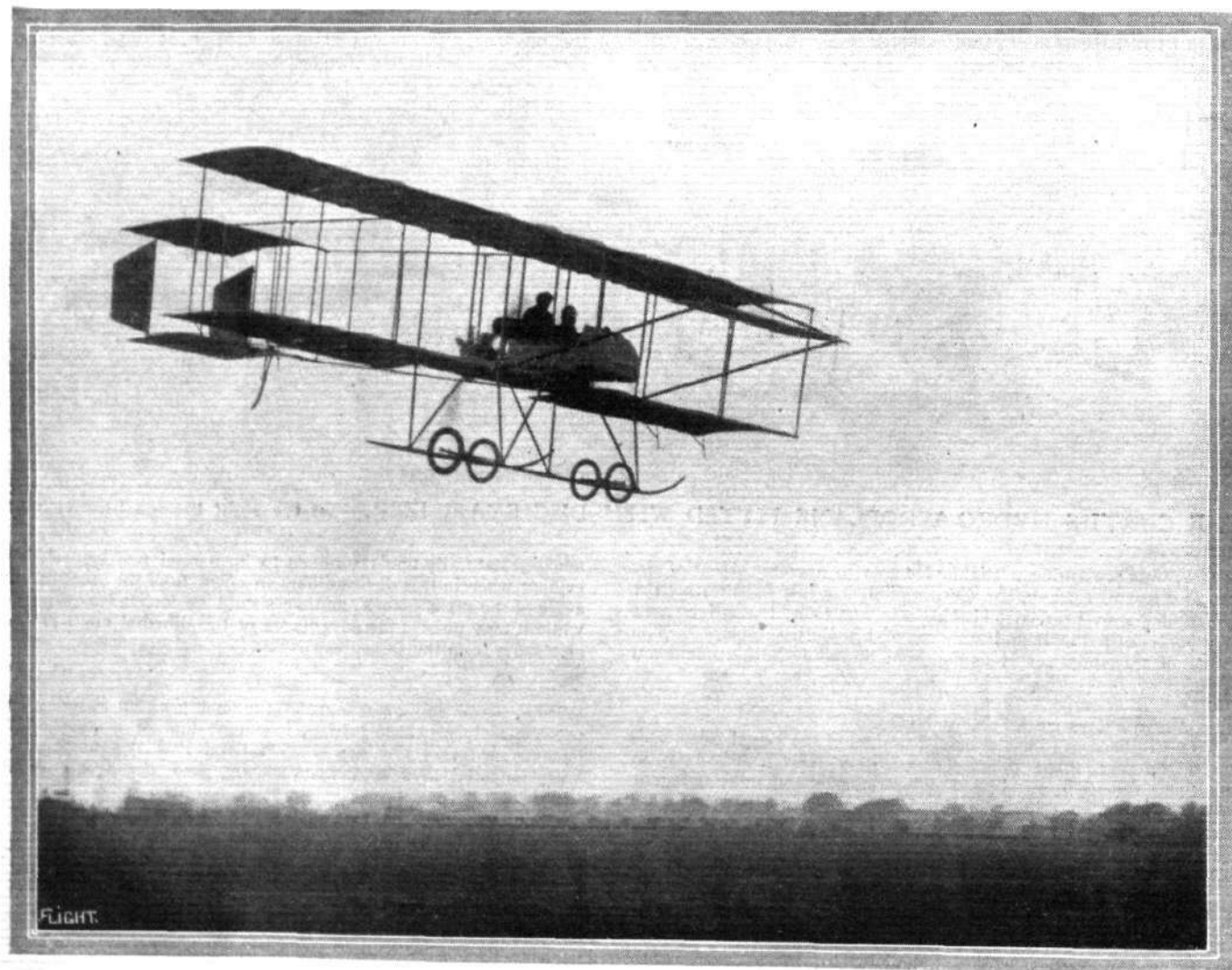
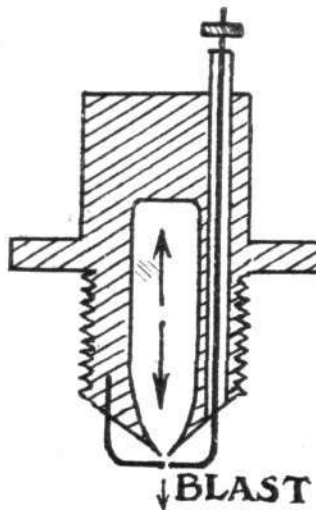
The use of two propellers, large and concentrically mounted, and driven at a comparatively slow speed, would make an aeroplane easier in every way, and the question of the differential gear needed does not seem to be beyond our engineers' skill.

Two independent engines, acting concentrically, is also possible, and has many advantages.

If there are inherent difficulties in the above suggestions, the writer would be very grateful to have them pointed out.

Pembridge Crescent.

B².



Mr. Cecil Pashley flying with a passenger at Shreham Aerodrome.

"Flight" Copyright,

Models

Edited by V. E. JOHNSON, M.A.

Some Hints for Beginners.

JUDGING by the very large stock of model aeroplanes which we happen to know a particular firm provided themselves with just prior to Christmas, they certainly must have expected an exceeding large demand for the same as Christmas or New Year presents; and although just at this time of the year the climatic conditions cannot be considered exactly propitious, it is undoubtedly a fact that every year at this season a very large number of "models" of all kinds come, for the first time it may be, into the hands of juveniles who are naturally all eagerness to "see the model work." Now, in the case of the older type of models such as locomotives, yachts, motor boats, &c., there is always either the "Pater" or Uncle "Tom," or Cousin "Dick," to say nothing of Brother "Bill," who "knows all about it," and the machine is soon got to work. It cannot be said, however, that at present the same is true of aeronautical models. Here the "Pater," Uncle "Tom," &c., sad as the fact is to relate, not infrequently know less about the matter than the youngster, with the result, that at the very first attempt it is by no means an uncommon thing for the model to be launched the wrong way about and come to grief. Now if you are an expert no model is perhaps more easily and quickly repaired than a model aeroplane; in the hands of a novice, we must confess the task is almost a hopeless one. Of course it can be repaired "somehow," but by repaired we mean mended in such a manner that it will, practically speaking, go on flying as well as before.

It is, therefore, of primary importance that a smash-up to start with should be avoided if possible.

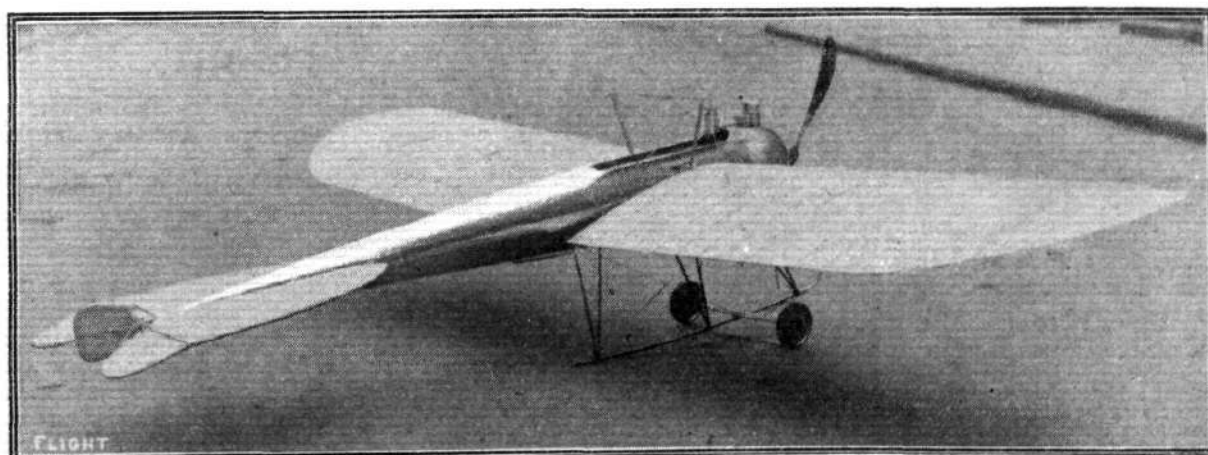
Let us, however, first consider very briefly the case in which the reader has not yet purchased the model. If you know nothing whatever about model aeroplanes, nor your people either, it is best perhaps bought over the counter from a shopman who both can and will give you the necessary preliminary instructions as to its working. Avoid anything in the nature of a record-breaking model in the first instance, and choose one with a single propeller which flies with the elevator or small plane *foremost*. To obtain good results with any model, two things (amongst others) are essential; the rubber must be of the best, and it must be *fresh*. On no account buy what is obviously old stock, no matter how cheaply it may be offered to you. The rubber to be any real use must be capable (when new) of being stretched to at any rate *8 times its own length without fracture*. If it won't do this, don't buy it. The rubber must also be well lubricated. There are quite a number of good lubricants on the market; do not choose one which is too thick or looks at all dried up. Remember the rubber must be lubricated frequently. It should also always be removed from the machine after you have finished flying. It should on no account be passed round bare metal hooks; if this is the case buy a pennyworth of bicycle valve tubing, cut it up into suitable lengths and place on the hooks *before* using the machine. On no account buy a machine which is loose or flabby, or which, when shaken, "wibble-wobbles" all over the place; but a taut, well trimmed up machine, possessed at the same time of a certain give or flexibility which all aeronautical machines should possess. On no account try flying the machine in

the house, or see (supposing the model one fitted with wheels) if it will "get off" the dining-room table. This advice may seem quite superfluous, and yet it is not so, for we personally know of quite a number of instances in which the above has been done, nearly always with disastrous results: not always to the model, be it noted—more often to something intrinsically of much greater value. The smashing of a fifty-guinea vase (which we know of as occurring in one case) could scarcely be considered as equated by the clearly demonstrated fact that the model would really fly. Generally speaking, of course, pictures are the worst sufferers—first of all, that is. It is also most unwise to fly the model in a garden (large or small) in which there are numerous obstructions, such as trees, &c. Hundreds and hundreds of models have been smashed up in this way.

Before actually trying to fly your model at all, there are quite a number of things for you to learn, all of which *can* be learnt either in the house or garden.

There is first of all the question of winding up, which reminds us that we have omitted the question of a "winder." As these can be purchased quite cheaply or easily adapted from an egg-beater or a drill, one should certainly be used. Now we have in this case supposed the propeller situated in the rear of the machine, evidently then the propeller, or, to speak more correctly, the rubber motor, must (by means of the winder—fitted to or round the boss or central part of the propeller) be wound up in such a direction that *when the propeller revolves*, the machine being held stationary, a column of air is driven backwards behind the propeller, to the rear of the machine. As to the number of "turns" which can or should be given to the rubber motor, it is somewhat difficult to say exactly, but the following statement is, we think, a fairly safe one. Provided the rubber be well lubricated, 500 turns can at any rate be given. This supposes the rod carrying the motor not much longer than the breadth or span of the machine. If this be so 750 to 1,000 turns can be given; but a model in which the *fuselage* does not exceed to any great extent the breadth of the machine is best. The above statement must be considered only a very approximate one, and as applying solely in a general way to commercial machines.

Having mastered the winding up, not forgetting to always keep the bearings well oiled, we pass on now to "gliding" or "launching" the machine in the open, with rubber motor and propeller *in position*, but the motor not wound up. The following applies equally well, whether the model be a hand-launched or r.o.g. (rise-off-the-ground) machine. Holding the model by both hands—the left hand grasping some fairly forward part of the *fuselage* or motor rod, and the right hand the central portion, bracket, bearing, &c. of the propeller, in such a manner as would prevent the propeller from rotating, supposing that the motor was wound up—point the nose or front of the machine *slightly* downwards and launch fairly fast into the air. Release the left hand just a moment *before* the right. If your model makes a nice even glide to earth, your elevation is probably correct; try several times to make sure. Is the machine plunges nose first to the ground, you must increase the angle at which your elevator (small front plane) is set; do this little by little until you obtain good even



Three-quarter rear view of the Desoutter model monoplane, scale drawings of which were given on November 8th last.

glides. If your model soars up into the air and finally either comes down backwards on to its hind quarters, *i.e.*, sits down, as it were, or after careering up into the air nose dives to the ground, this shows over elevation, and the angle must be made less. Having correctly adjusted this, you are now in a position to wind up your model and try the same in actual free flight. If the model is a hand-launched one, then you will launch it in exactly the same manner as when gliding it; if there be a breeze it is generally preferable to launch it against it; be sure you don't point it nose upwards when doing so—launch it quietly. If you launch it with the breeze, launch it much harder and point the nose somewhat upwards. Never launch the model *across* the wind. If the model be an r.o.g. one, select a smooth level piece of ground, wind up your motor, place the model with its wheels on the ground, being careful in this case that the model *faces* the breeze, and just release the propeller, don't give the model any push. Let it do it all on its own. If the model in either case when flying "switch-backs" in the air, soaring up and down, it is a sign of slight over-elevation. If it comes to the ground with the rubber motor not fully unwound—say half run out—it is a sign of one of two things, or it may be both. It is either under-elevated or under-powered, and it may be both. If it swoops up into the air and then nose dives it is over-elevated only. An over-powered and over-elevated model not unfrequently "loops the loop."

In the case of a present the model may not, of course, be of the above type; it may be a tractor model, *i.e.*, one which flies large plane forward, propeller (in this case usually termed a tractor) in front. To the initiated the difference is very plain, but those who are not so often experience the greatest difficulty in distinguishing the two types. The following is undoubtedly a very unscientific manner of discriminating between the two, yet we believe it will always do so. Set the model on its wheels on a table or bench and note carefully if the smaller plane is at a lower level than the front, as in a Blériot, for example; it at once follows that the model flies propeller first. If the small plane is at least on a level with the main plane, or even higher than it, the model is of the elevator in front, propeller behind, so-called canard type. Other differences are: In the latter type the elevator is generally quite small—is not unfrequently set above the motor rod. In the tractor type the propeller has almost invariably a "skid" or chassis extension, extending underneath and forward of the propeller to protect the latter when landing. Even in a hand-launched model this should be present. A little careful consideration will also show the reader that the propeller which has the convex side of its blade always *in front*—*i.e.*, in the direction of motion—affords a ready method of determining the above. Therefore the propeller must always be wound in such a manner that it is (apparently) the concave side which drives the air back. Some propellers have a convex and an almost plane side—if this be the case the flat side should be hollowed out by means of careful sandpapering—as the efficiency of the propeller will be considerably increased. There is also another type of machine which flies main plane first; it is a tail-type machine fitted with two propellers in the rear. It does not represent any type of full-sized machine so far in existence, and it cannot be said to be a novice's machine. So far as actual flying results go, it has some very fine records to its credit. The question of elevation in this machine, as also in that of many tractors, is solved by moving the main plane along the motor rod or fuselage: forward for more elevation, backwards for less. Some tractors are adjusted by increasing or decreasing the angle of the tail or the small auxiliary planes attached.

The best and most easily adjusted machine for the beginner to commence with is the small planes in front or canard type.



KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration	D. Driver...	85 secs.
Twin screw, do. ...	Distance	R. Lucas ...	590 yards.
	Duration	G. Hayden ...	137 secs.
Single screw, rise off ground	Distance	W. E. Evans ...	290 yards.
	Duration	W. E. Evans ...	64 secs.
Twin screw, do. ...	Distance	L. H. Slatter ...	365 yards.
	Duration	J. E. Louch ...	2 mins. 49 secs.
Single-tractor screw, hand-launched ...	Distance	C. C. Dutton ...	266 yards.
	Duration	J. E. Louch ...	91 secs.
Do., off-ground ...	Distance	C. C. Dutton ...	190 yards.
	Duration	J. E. Louch ...	94 secs.
Single screw hydro., off-water	Duration	L. H. Slatter ...	35 secs.
Single-tractor, do., do.	Duration	C. C. Dutton ...	29 secs.
Twin screw, do., do.	Duration	L. H. Slatter ...	60 secs.

Affiliation.—All affiliated clubs should send in their affiliation subscription of ros. 6d., together with list of officers and members, also all clubs wishing to become eligible to compete in the inter-team competition to be held in connection with the Aero Exhibition, and also for the Farrow shield during the year, should send in their applications without delay. Affiliated clubs also will have special reduced charge for club exhibits at the exhibition. The following have already reserved club stands: The Leytonstone Aero Club, The North East

London Ae. Club, Paddington Club, Stony Stratford Kite and Model Aeroplane Club, and The Reigate, Redhill, and District Ae. Club.

Vice-Patron.—His Majesty King Manoel has honoured the Association by becoming a Vice-Patron; also Their Majesties Queen Amelia and Queen Augusta Victoria have been elected members of the Association.

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AFFILIATED MODEL CLUBS DIARY.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

JAN. 11TH, model flying, Wanstead Flats, 10 a.m., as usual. If wet, meet at club room.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

JAN. 10TH, flying, Sudbury. Annual general meeting at secretary's house, 6 p.m. The attendance of all members is particularly requested.

Wimbledon and District (165, HOLLAND ROAD, W.).

JAN. 10TH and 11TH, flying as usual.

UNAFFILIATED CLUBS.

Finsbury and District (85, UPPER TOLLINGTON PARK, N.).

JAN. 10TH, flying, 3 p.m., Finsbury Park.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

JAN. 10TH, Woolwich Common, 3.30 p.m. until dusk. Jan. 11th, Blackheath, 7.30 to 10 a.m.; Lee Aerodrome, 10.30 a.m. to 12.45 p.m. Members are requested to accelerate the construction of models intended for the club's first indoor exhibition, to be held at the Central Hall, High Street, Peckham, on the last Thursday in this month, 7 to 10 p.m. Every member is expected to exhibit.



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PUBLICATIONS RECEIVED.

Almanack, 1914. Phillipps, 70, Chancery Lane, W.C.

Aero-Manuel, 1914. By Ch. Faroux and G. Bonnet. Paris: H. Dunod and E. Pinat, 47-49, Quai des Grands-Augustins. Price 12 frs.

Catalogue.

White and Poppe Engines and Carburettors. White and Poppe, Ltd., Lockhurst Lane, Coventry.



Aeronautical Patents Published.

Applied for in 1912.

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25,348.	G. M. ABSALOM. Safety balanced air machines.
25,529.	J. G. A. KITCHEN AND I. H. STOREY. Flying machines.
28,440.	H. D. DE M. CAREY. Stability of flying machines.
28,596.	H. E. WIMPERIS AND G. K. B. ELPHINSTONE. Indicating speed of aircraft.
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5,223.	J. R. PORTER. Construction of aeronautical machines.
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